ELECTRIC VEHICLE SUBCOMMITTEE MEETING MINUTES

(Subcommittee of the Lebanon Energy Advisory Committee)

City Hall Council Chambers

December 12th, 2024, 3:00 PM

-- Final --

MEMBERS PRESENT: Sherry Boschert - Chair, Tom Benzel, Bill Stearns, Clifton Below

MEMBERS ABSENT: None

STAFF PRESENT: Tad Montgomery - Energy & Facilities Manager

GUESTS PRESENT: Jon Livadas from Hanover and the Woolen Mill Development Project

1. **CALL TO ORDER:** Ms. Boschert called the meeting to order at 3:05 p.m.

2. **APPROVAL OF PAST MINUTES:**

   Mr. Benzel moved to accept the November 2024 EV Subcommittee minutes; Mr. Stearns seconded. Approved unanimously.

3. **OLD BUSINESS**

   A. **Lebanon Workplace EV Charging Policy** – Mr. Montgomery said that the Finance Director had told him she would work on developing the payment system for Staff use of City EVCS earlier that week.

   B. **Charging and Fueling Infrastructure Grant (CFI)** – Ms. Boschert said that there was no news to report.

   C. **Request for Proposals (RFP) for EV Charging Stations** – Ms. Boschert expressed a desire for the City to move forward with an RFP for the proposed EVCS sites that are on City property and within the federal census tract that qualifies for Direct Pay and/or TIF funding. She believes that TIF district funds will be available. Mr. Montgomery proposed including the other sites in the RFP with a statement about their being on private property and without financial support. This led to a discussion and Ms. Boschert proposed that instead of including them as sites in the RFP that they simply be listed and described as vetted in an appendix with contact info for the landowners. She

said that she would get the landowners' approval first.

D. **Solar e-Bike Charging Stations** – Mr. Montgomery said that the Dartmouth engineering students have said that their report should be delivered soon. He spoke with local e-bike expert Karl Kemnitzer about the latest plan for the EBCS in Colburn Park, the Tunnel, and Kilton Library. Mr. Kemnitzer said that he might be aware of a possible funding source for the EBCS but expressed concern at the potential for one being outdoors and uncovered. Mr. Montgomery presented a document that Mr. Kemnitzer has written describing the issues with outdoor EBCS (attached to these minutes).

E. **Potential Revisions to Zoning Ordinance** – Ms. Boschert gave an overview of work that she and Mr. Benzel have been doing with the Planning Office on revising the EVCS zoning ordinance. There was a good discussion on the revisions proposed so far, and Jon Livadas of the Woolen Mill Development Project gave his perspective on the need and costs that this ordinance would create for that housing development. There was a productive back-and-forth.

4. NEW BUSINESS

A. **Lebanon fleet EVs** – Ms. Boschert wondered what vehicles the City is planning to purchase next year and/or in the near future, and if any of them are planned to be electric. She said that she would discuss this with DPW managers or the City Manager.

B. **Upper Valley EV Expo** – Ms. Boschert discussed options for locations for the 2025 Expo as well as a possible Earth Day EV event.

C. **EFM Report** - Mr. Montgomery showed two documents that he has recently been forwarded by Karl Kemnitzer regarding ebike charging.

- Drive Electric Vermont Stakeholder Meeting - Dec. 10, 2024
- Vermont Weights and Measures EVSE Program

5. OPEN TO THE PUBLIC

There was no public discussion.

6. UPCOMING EVENTS AND FUTURE AGENDA ITEMS:

Tuesday, Dec. 17, 1-2 pm -- Forth webinar reviewing the past year & the outlook for electrifying transportation. Register here.

7. NEXT MEETING:

The date of the next meeting is Thursday, January 9th, 3 p.m., Council Chambers, City Hall.

8. ADJOURNMENT:

Ms. Boschert moved to adjourn the meeting at 4:17 PM without discussion or dissent.

Respectfully submitted,

Tad Montgomery

Attached PDF below:

- Weather Protection For Ebike Charging Stations by Karl Kemnitzer.

Ebike chargers are not designed for outdoor exposure

•The labels on typical chargers have the "house with arrow to inside" symbol meaning indoor use only
•Neither the standard 120 V plug or the coaxial battery pack plugs are designed for exposure to water
•There aren't any IPxx ratings on the chargers (https://en.wikipedia.org/wiki/IP_code)

Conclusion: Protection equivalent to an indoor environment is necessary for these chargers. A roof will provide both water protection and sun (overheating) protection. It will not provide frigid temperature protection, (but batteries should not be charged below 32 F anyhow).

I think the ebike charging stations in Burlington are simple exterior outlets with a rainproof cover, but I have not received confirmation of this yet. If so these locations are depending on riders not charging in the rain.

(over)

Most Dero ebike charging stations, https://www.dero.com/product-category/e-bike-charging-racks/ also assume no one will charge in the rain, however their top of the line model has a drawer that riders can lock the charger into for both theft and rain protection, leaving only the coaxial plug on the battery pack exposed to water.

(Note that the one NYC subcontractor deliverista hub station that uses 'battery on the bike' pedestal charging stations uses an XLR style connector instead of coaxial which is more water resistant):

The ebike charger can be locked inside this compartment with the cords exiting through the handle slot, which fulfills the indoor IPxx rating of the charger. (A locally sourced version of this could be made with a standard hoop bike rack and a NEMA 3R box with a covered outlet plus some custom fabrication for the drawer - consult town electrical inspector though.)

From a planning viewpoint these charging setups will not be used during extreme weather, and similar to the Burlington stations it is fine to provide simple 120 V outlets (with GFCI) that have a cover. By the time there are many commuters who need to charge during bad conditions these stations will be worn out and replaced with better versions.

<u>However the best goal is covered bike parking for ALL bikes, and this solves two problems with one roof.</u>

Lebanon's Zoning Regulations on EV Charging:
The Case for Low-power Level 2 (LPL2)

By Sherry Boschert, January 2, 2025

The Lebanon Energy Advisory Committee's Electric Vehicle (EV) subcommittee has proposed modifying Lebanon's Zoning regulations regarding EV charging in order to "right-size" the requirements by including the option of Low-power Level 2 (LPL2) charging. This should save money for developers, drivers, and our community as a whole while reducing stress on the electrical grid and lowering greenhouse gas emissions compared with the current Zoning regulations.

In response to the Planning Department's request for examples of LPL2 use and associated costs, below is an examination of experiences with LPL2 charging, in sections:

1. Summary
2. Driver habits
3. Energy
4. Costs and emissions
5. Existing and proposed regulations
6. Sources
7. Appendix A – Proposed Zoning amendments

Key terms and acronyms:

L2 = Level 2 EV charging (on a dedicated 40- to 100-amp breaker and 208/240-volt circuit drawing 6.2+ kW to supply 19+ miles of range per hour of charging).
LPL2 = Low-power Level 2 EV charging (on a 20-amp breaker and 208/240-volt circuit drawing 3.3-6.1 kW to supply approximately 15+ miles of range per hour of charging).
EV Installed = Everything needed for EV charging is installed for the parking space including an EV charging station (EVCS) and port that plugs into the car.
EV Ready = Everything needed for EV charging is installed for the parking space minus the charging station/port, but with an electrical outlet that drivers can plug into using their own charge cords.
EVCS Capable = Most components needed for EV charging at the parking space are installed (electrical panel capacity, space for a dedicated branch circuit, and mounted raceways) to enable easy future conversion to EV Ready or EV Installed.

1. Summary

I am still seeking examples of LPL2 use on the East Coast. On the West Coast, it is becoming almost the standard for multi-unit housing. For example, in the State of California (the nation's largest vehicle market), changes to the California Green Building Standards Code (CALGreen) go into effect at the start of 2026 that require at least one LPL2 EV-Ready charging for every unit with parking at new multi-unit housing. If there are more parking spaces than units, 25% of the additional spaces also must have LPL2 EV-Ready charging.

Reports and experiences from West Coast sources show that making LPL2 charging available to all units with parking at new multi-unit housing developments would result in greater economic and environmental benefits for residents and communities as a whole at a cost to developers that is comparable to or less than installing a smaller proportion of L2 EV charging stations. Residential LPL2 also reduces stress on the electrical grid and fewer greenhouse gas emissions compared with installing smaller numbers of L2 stations.

2. Driver habits

EVs in the United States grew to approximately 3.3 million in 2023, up from 2 million in 2022 and 1.3 million in 2021. Projections suggest that half or more of new vehicles sold by 2035 will be EVs. In Lebanon, there were 95 registered electric vehicles (EVs) and plug-in hybrid vehicles (PHEVs) in December 2024 compared with 58 in 2023, a 64% increase. Plug-in vehicles now make up 3.5% of vehicles in Lebanon, up from 0.5% in 2020.

A recent J.D. Power report showed that 83% of EV owners prefer to charge at home. Most of the 31% of Americans who live in multi-unit housing lack residential charging options. In the past two years the percentage of renters interested in or relying on EV charging jumped from 27% to 34%, according to the National Multifamily Housing Council and Grace Hill 2024 Renter Preferences Survey.

Except on long-distance road trips, EV drivers "top off" when charging rather than "filling up" like gas-car drivers do when refueling. The most logical, safe, and convenient place to charge an EV is at home, where vehicles tend to sit for 8-12 hours of each day. Residential EV charging allows drivers to plug into lower-power electrical sockets that still meet most commuters' needs while utilizing least-cost residential electrical rates.

LPL2 EV charging could meet the daily charging needs of 94% of commuters residing in the Lebanon Micro New England City and Town Area, according to my analysis of a study by Meghan Butts of the Upper Valley Lake Sunapee Regional Planning Commission. The remaining 6% of commuters might seek additional charging on the other end of their commute or would occasionally utilize public L2 or fast EV chargers.

LPL2 charging for each unit at multi-unit housing provides the same convenience enjoyed by residents of single family homes – the ability to leave a vehicle overnight without having to move it from a shared charger, and knowing they'll wake up to a charged car.

3. Energy

Orange, Inc. (one of the companies specializing in LPL2 and L1 charging) reported in a 2023 paper that usage data from its charging outlets showed that drivers needed an average of 16.8 kW of electricity per day. That need may be slightly higher in New Hampshire conditions than in California but is easily met overnight with 4-6 hours of LPL2 charging, which delivers 3.3-6.1 kW. Requiring L2 stations that deliver 6.2+ kW at multi-unit housing is overkill; residential LPL2 is right-sizing charging at less cost and greater convenience.

Using those numbers and California grid data from 2022, Orange also forecast potential impacts on the U.S. electrical grid. If 25% of an expected 10 million EV drivers in 2035 live in apartments with LPL2 charging and charge between 9 p.m. and 9 a.m. daily, those 2.5 million cars would need 9.5 GWh of energy per hour. Without LPL2 charging at home, though, if those drivers use public fast-charging stations two or three times per week before or after work, they would require 312,500 GWh of peak load (if all plugged in at once), which is many multiples of current grid capacity.

Several scenarios below estimate what the energy capacity would need to be under Lebanon's current or proposed Zoning regulations for EV charging at multi-unit housing.

A. If current Zoning requires one off-street parking space per studio apartment and 5% of those spaces must be L2 Installed, that's 20 EVSE Installed spaces for a development with **100 studio apartments**. Two adjacent spaces are allowed to share one charger circuit, so at least (10) 40-amp circuits would be needed, or 400 amps. And 20% of the remaining 80 spaces must be EV-Ready; that's 16 more spaces requiring at least 8 shared 40-amp circuits, or 320 amps. And 50% of the remaining 64 spaces must be L2 EV-Capable; that's 32 more spaces needing at least (16) 40-amp circuits, or 1,280 amps. The total comes to **2,000 amps for those 70 spaces with EV charging access now or in the future, and 30 parking spaces (30%) would get no EV charging at all.**

B. Currently, apartments with **one or more bedrooms** may require up to 1.5 parking spaces per unit, which is 50% more than for studios. The electrical capacity needed for L2 EV charging for 70 of **100 units** either now or in the future would be **3,000 amps and, still, 30% of spaces would get no EV charging** now or in the future.

C. **Under the proposed Zoning amendments**, LPL2 could meet residents' daily charging needs using much less energy. For **100 studio apartments** with 100 EV-Ready LPL2 parking spaces, two adjacent spaces are allowed to share one charger circuit, so at least (50) 20-amp circuits would be needed, or **1,000 amps**, **and all 100 units would have EV charging.**

D. Under the proposed Zoning amendments, for **100 units with one or more bedrooms**, **each unit gets an EV-Ready LPL2** charging space and two adjacent spaces can share one charge circuit, requiring 1,000 amps. **And 25% of the remaining 50 spaces would be EV-Capable LPL2** -- so, 13 spaces, with two adjacent spaces allowed to share one charger circuit, requiring at least (7) 20-amp circuits or 140 amps. That totals **1,140 amps and all 100 units would have EV charging.**

Note: Other EV charging infrastructure options may reduce the energy load further. For example, the addition of "load management" or a "load balancer" to LPL2 stations at multi-unit housing might serve four to six times more charge ports compared with unmanaged L2 stations and use half the electrical capacity.

4. Costs

Although the cost of installing EV charging necessarily is site-specific, LPL2 EV Ready requires less electrical infrastructure compared with L2 Installed. LPL2 also lowers costs for installation and maintenance of EV charging stations by using less expensive charging outlets instead of full

charging stations. The money saved by not requiring L2 Installed EV charging stations for multi-unit housing provides builders with sufficient funds to include LPL2 outlets for every unit at equivalent or less cost, studies suggest.

Charging at home on residential rates typically costs drivers half as much as using public, third-party chargers. Presumably, building managers will prefer LPL2 outlets because there are fewer shared EV chargers to manage, and residents will prefer LPL2 outlets because of EV charging access for all at less cost to drivers than using public chargers.

California cost comparisons:
A group of California State legislators compared two scenarios using low- and high-cost estimates for two different charging strategies. ***Strategy A:*** Provide one LPL2 EV-Ready space for all units with parking at multi-unit housing plus L2 EV Installed at 10% of open/guest/shared parking spaces. ***Strategy B:*** Provide L2 Installed charging stations at 10% of total parking spaces and LPL2 EV Ready charging at 40% of total spaces.
The associated costs ranged from $789-$1,485 for each LPL2 EV Ready space and $2,596-$3,883 each for L2 Installed.

1. For a hypothetical new 100-unit residential building with 300 parking spaces where each unit has 2 dedicated parking spaces and there are 100 common/guest parking spaces, Strategy A would require 576 kW total (at the breaker) and cost $104,893-$187,319. Strategy B would require 864 kW and cost $172,596-$294,675. **Strategy A was 36%-39% less expensive and provided universal access to EV charging.**
2. For a hypothetical 100-unit apartment complex with 180 parking spaces where 50 units have 1 dedicated space, 50 units have 2 dedicated spaces, and there are 30 common/guest spaces, Strategy A would require 509 kW and cost $86,722-$160,139. Strategy B would require 518 kW and cost $103,558-$176,805. **Strategy A was 16%-9% less expensive and provided universal access to EV charging.**

Peninsula Clean Energy, at the 2025 National Community Choice Aggregation Conference:
The director of Energy Programs for Peninsula Clean Energy reported that installing LPL2 or L1 charging can be seven-fold less expensive than installing L2 charging. The marginal cost during construction for new buildings to install LPL2 charging (compared with no charging) is 0.3% of total costs.

Orange Charger, Inc. comparisons:
The experience and estimates of Orange (one of the companies specializing in LPL2 and L1 charging) suggest that adding LPL2 EV Ready for every unit with parking at new multi-unit developments adds 0.3%-0.5% to construction costs.

On its website, Orange estimates that the costs of installing and operating two LPL2 EV-Ready outlets would be 69% less than the costs for a two-port L2 EV Installed charger -- $2,750 vs. $8,750.

In a 2023 paper on case studies at multi-unit properties, Orange reported that installation of a LPL2 EV-Ready outlet may cost as low as $3,600 compared with $8,000-$12,000 for L2 EV Installed.

In a 2022 presentation, Orange estimated that for a multi-unit apartment complex in San Mateo, Calif. with 26 EV chargers, the 10-year up-front and ongoing costs for LPL2 outlets would be approximately $47,320 compared with $244,000+ for networked L2 chargers.

Factoring in potential charging revenues and service fees/commissions, the LPL2 installations could break even in 3 years compared with 18-20 years for the L2 stations.

Sven Thesen & Associates:
This consultant compared two proposed EV infrastructure codes for multi-unit housing: one requiring LPL2 for each unit with parking and the other requiring L2 charging at 40%-73% of unit spaces (5% L2 EV Installed, 25% LPL2 EV Ready, and 10% L2 EV Capable).

For 150,000 new multi-unit housing dwellings expected to be built over a 20-year period, the LPL2 strategy would result in greater benefits in seven of eight measures:

- Shorter society payback time (years for cumulative savings to exceed initial costs)
- Faster societal internal rate of return
- EV charging available to more housing units
- Greater net residents' and societal savings
- More carbon dioxide emissions avoided
- Reduced cost for emission reductions
- Utility retrofit costs avoided

Initial construction costs would be $28 million higher for LPL2 for 150,000 housing units compared with installing L2/LPL2 for a subset of units ($205 million vs. $178 million). That initial investment in LPL2, though, would produce a $1.4 billion reduction in other costs and avoid 2.9 million more tons of carbon dioxide emissions compared with the L2/LPL2 strategy, the report stated. The analyses did not factor in an estimated $0.7-$1.6 billion that would be needed later to add EV charging to spaces that don't get them initially under the L2 strategy.

5. Existing and proposed regulations

LPL2 Examples:

- See the proposed Lebanon Zoning amendments in Appendix A.

- The San Jose (Calif.) City Council unanimously adopted a strong EV charging code for new multi-family housing on January 30, 2024. Instead of L2 EV charging access at 30% of residential parking spaces, every residential parking space will be equipped with a **LPL2** receptacle, and each residential unit with assigned parking will have their receptacle directly wired to their panel or meter. The Council approved an exemption from the direct-wiring requirements for "unbundled" parking (i.e., parking that is paid for on a separate lease).

- On December 17, 2024 California regulators unanimously adopted amendments to the California Green Building Standards Code (CALGreen) to go into effect at the start of 2026 that require at least a **LPL2** outlet or charger (i.e., EV Ready or EV Installed) for any new unit with a parking space at multi-unit housing. (These could be standardized outlets – NEMA 6-20, 14-30, or 14-50 -- or J1772 or J3400 chargers.) The LPL2 spaces are allowed to share power between them as long as the system can provide a minimum of 3.3 kW simultaneously to each unit. If parking spaces are assigned, the EV charging for each space will be on a separate circuit wired to that unit's electrical panel "when feasible." If parking spaces are shared, there must be at least one EV-Ready space per unit. If there are more parking spaces than there are units, at least 25% of the excess needs to be EV Ready or Installed. These codes apply not just to new developments but any time a parking space is added or altered at an existing development in a way that requires a building permit.

The new California codes also include mandates for hotels or commercial, office, or retail developments. At least LPL2 EV Ready or EV Installed is required at 65% of parking at new hotels or motels and 20% of spaces at new commercial, office, or retail parking lots. In some cases, property owners can install DC fast charging to reduce the required number of LPL2 spaces.

- Bay Area Air Quality Management District Draft Charge! Program Guidance for Fiscal Year Ending 2025: BAAQMD grants for EV charging infrastructure may be awarded to LPL2 or L1 chargers but only at multi-unit housing facilities.

L2 examples:

- Lebanon's current Zoning regulations, 2023: See Lebanon's Zoning Ordinance, especially pages 131-132 and definitions on pages 183-184 and 187. These require at least one EV-Ready L2 space at new one- or two-family homes. At off-street parking for new multi-unit housing, they require 5% of parking spaces to have installed L2 EVSE, 20% to be L2 EV-Ready, and 60% to be L2 EV-Capable. At new non-residential developments with at least 30 off-street parking spaces, 2% of spaces must have L2 EVSE, 10% must be L2 EV-Ready, and 50% must be L2 EV-Capable.

- Dover, N.H. 2021: At https://ecode360.com/33400371 see Chapter 153 (Site Review Regulations), Part 14 (Site development design criteria), Section D (Parking), specifically items § 153-14(D3) and § 153-14(D5.a.5). Section D3 requires EV-Ready L2 spaces at 5% of parking for new multi-family residential projects and 2% of parking at non-residential projects. In Section D5.a.5., a conditional use permit for an increase in the number of parking spaces requires one L2 Installed charging station for every 10 requested parking spaces over the parking maximum where use of the parking space typically results in at least two hours of parking, and two L2 Capable charging spaces for every 20 spaces requested where use of the space typically doesn't last two hours or longer.

- City of Boston Electric Vehicle Readiness Policy for New Developments: L2 EV Installed at 25% of parking spaces and L2 EV Ready at 75% of spaces, or the equivalent charging capacity through slower or faster charging stations as determined by a point system that weights various charger types to ensure that the same number of EVs are served per unit of time (with extra points for EV Car Sharing or Electric Bike Parking).

Unspecified power levels:

- Vermont Upper Valley: The 2023 Climate Action Plan by the Two Rivers Ottauquechee Regional Commission, page 3, calls for implementing an "EV Ready" building ordinance requiring new developments to have panel capacity and conduit in place (i.e., "EV Capable") to charge EVs and establishing minimum parking requirements for exclusive EV use. It also calls for parking garages to have at least 20% of spaces served by charging outlets at construction and an additional 20% every 5 years thereafter.

6. Sources

"Why EV Charging is the Ultimate High-Tech Amenity for Modern Multifamily Residences," *Buildings*, November 11, 2024: https://www.buildings.com/resiliency-sustainability/electrification/article/55241601/why-ev-charging-is-the-ultimate-high-tech-amenity-for-modern-multifamily-residences

Email communications from town officials in Dover, N.H.

Climate Action Plan, Two Rivers Ottauquechee Regional Commission's Intermunicipal Regional Energy Coordinator Program: https://www.trorc.org/wp-content/uploads/2023/04/TRORC-IREC-CAP-V4-1.pdf

Email communications with Wendy Chou and Dennis Murphy, Acterra.

"California will require EV charging for all new residential units in 2026," *Electrek*, December 18, 2024: https://electrek.co/2024/12/18/california-will-require-ev-charging-for-all-new-residential-units-in-2026/#:~:text=California will require EV charging for all new residential units in 2026,-Jameson Dow | Dec&text=California's new building codes will,only actual problem with EVs.

Letter from 11 California State legislators to California Building Standards Commission Community Development Staff , May 15, 2023 regarding "Electric Vehicle Charging Clarification in the CALGreen Intervening Code Cycle.

"Scaling EV Charging Program Impacts," presentation by Phillip Kobernick, Peninsula Clean Energy, at the 2024 National Community Choice Aggregation Conference.

Papers, communications, and slide decks from Orange including "Building Affordable Equitable Charging to Multi-Unit Properties with Lower Power Charging," July 11, 2023 and others.

Electric Vehicle Readiness Policy for New Developments, City of Boston: https://www.boston.gov/sites/default/files/file/2020/03/EV%20Readiness%20Policy%20For%20New%20Developments%20%287%29.pdf

Charge! Program Draft Guidance for Fiscal Year Ending 2025, Bay Area Air Quality Management District: www.baaqmd.gov/charge

A Comparison of Two Multi-Family Dwelling EV Charging Codes," Sven Thesen & Associates, 2021: https://tinyurl.com/mu3zvk9n

APPENDIX A

Draft amendments to Zoning Ordinance (with proposed changes in red)

From Zoning Ordinance pages 183-184:

607.8 Electric Vehicles.

A. Purpose. The purpose of this section is to facilitate the transition to ***electric vehicle*** use and to expedite the establishment of convenient, cost-effective ***electric vehicle infrastructure*** that such a transition necessitates.

B. Applicability. ***EV charging stations*** are allowed as an ***accessory use*** in all zoning districts. When the retail charging of ***electric vehicles*** is proposed to be the principal use of a ***lot***, then the proposed ***EV charging station*** shall be considered a ***service station*** for zoning purposes.

C. EV Infrastructure Requirements / Off-Street EV Parking Requirements. ***EVSE-installed spaces, EVSE-ready spaces***, and ***EVSE-capable spaces*** shall be provided as follows:

1. One- and Two-Family Dwellings. All new ***one***- and ***two-family dwellings*** shall provide at least one (1) ***EVSE-Ready Low-power Level 2 charging*** space per ***dwelling unit***.

2. All new dwellings with up to three units, including Accessory Dwelling Units (ADUs), shall provide at least one (1) ***EVSE-Ready Low-power Level 2 charging*** space per dwelling unit.

3. Multi-Family Dwellings (four or more units). Parking for ***multi-family dwellings*** shall include:

a. For each residential unit with parking, **at least EVSE-Ready Low-power Level 2 charging space per unit**.

b. ***EV-Capable Low-power Level 2 spaces*** for a minimum of 25% of the remaining off-street parking spaces.

4. Non-Residential Uses. Parking for uses requiring or proposing to provide 20 or more ***off-street parking spaces*** shall include:

a. ***EVSE-Installed Level 2 spaces*** for a minimum of 2% of proposed ***off-street parking spaces***, with a minimum of two ***EVSE-Installed spaces***.

b. ***EVSE-Ready Level 2 spaces*** for a minimum of 10% of proposed ***off-street parking spaces.***

c. ***EVSE-Capable Level 2 spaces*** for a minimum of 20% of proposed ***off-street parking spaces***.

d. For parking spaces dedicated for employee use, these requirements may be replaced by a minimum of one EVSE-Ready Low-power Level 2 charging space for half of employees in the largest shift who drive to work.

e. For existing (not "greenfield") non-residential developments, these requirements for EV charging may be replaced by a contribution to a common fund managed by the City of Lebanon for installing public EV charging stations at a separate site, with the contribution amount to be determined by the City.

5. Where the calculations above result in a fractional parking space, it shall round up to the next whole number.

6. Where the number of ***EVSE-Installed spaces*** provided exceeds the minimum required, the excess spaces shall be deducted from the total number of required ***EVSE-Ready spaces*** of a similar level (Low-power Level 2, or Level 2).

7. Where the number of ***EVSE-Ready spaces*** provided exceeds the minimum required, the excess ***EVSE-Ready spaces*** shall be deducted from the total number of required ***EVSE-Capable spaces*** of a similar level (Low-power Level 2, or Level 2).

8. Up to ten (10) ***Level 2 EVSE-Installed spaces*** may be substituted with one (1) ***Level 3 EV-Installed space*** (minimum 150 kW).

9. ***EVSE-Installed spaces***, ***EVSE-Ready spaces***, and ***EVSE-Capable spaces*** are to be included in the calculation for both the number of minimum required and maximum permitted off-street parking spaces.

a. Every two (2) ***EVSE-Installed spaces*** provided in addition to the required minimum may be counted as four (4) ***off-street parking spaces*** as relates to Section 607.1 (Minimum Off-Street Parking Requirements), for reduction of total required parking not greater than 10 percent of the total amount of required parking.

Pages 183-184 and 187:

Appendix A – Definitions

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) / EV CHARGING STATION (EVCS): The apparatus installed specifically for the purpose of transferring energy between the site or building wiring and the Electric Vehicle. EVSE does not include any equipment affixed to the electric vehicle.

ELECTRIC VEHICLE INFRASTRUCTURE: Structures, machinery, and equipment necessary and integral to support an ***electric vehicle***, including ***EV charging stations*** and electrical outlets.

ELECTRIC VEHICLE (EV): An automotive-type vehicle for on-road use primarily powered by an electric motor, including any battery electric vehicle, ~~fuel cell electric vehicle,~~ or plug-in hybrid electric vehicle, that draws current from an onboard battery charged through a building or site electrical service, ***EVSE***, or other source of electric current.

EVSE-CAPABLE SPACE: An ***off-street parking space*** with electrical panel capacity and space for a branch circuit dedicated to the parking space that is not less than 20-ampere and 110/120-volt panel capacity for Level 1 charging, or 20-ampere and 108/240-volt for Low-Power Level 2 charging, or 40-ampere and 208/240-volt for Level 2 charging, and is equipped with raceways, both underground and surface mounted, to enable the future installation of ***EVSE***. For two adjacent EV-capable spaces, a single branch circuit is permitted.

EVSE-READY SPACE: An off-street parking space provided with a full dedicated branch circuit that includes not less than 20-ampere and 110/120-volt panel capacity for Level 1 charging, or 20-ampere and 208/240-volt panel capacity for Low-Power Level 2 charging, or 40-ampere and 208/240-volt panel capacity for Level 2 charging plus conduit, wiring, receptacle, and overprotection devices terminating in an outlet or receptacle ~~or junction box~~ that will support an installed EVSE or support attachment of a charge cord for the vehicle and which is located in close proximity to the location of the parking space. For two adjacent EV-Ready spaces, a single branch circuit is permitted. These spaces are "ready to go" as outlets for users who bring their own charging cords or with the addition of an installed EV charging station (EVCS).

EVSE-INSTALLED SPACE: An ***off-street parking space*** with a dedicated branch circuit and ***EVSE*** ~~at minimum~~.

LEVEL 1 (which is not mandated but is included here for informational purposes)**:** Charging level for ***EVs*** that operates on a dedicated 20-amp breaker (same kind used for conventional electrical outlets in most buildings) on a 110- or 120-volt AC circuit while drawing 1.9-3.2 kW to supply approximately 2-5 miles of range gained per hour of charging.

LOW-POWER LEVEL 2: Charging level for ***EVs*** that operates on a dedicated 20-amp breaker on a 208- or 240-volt AC circuit while drawing 3.3-6.1 kW to supply approximately 15+ miles of range gained per hour of charging.

LEVEL 2: Charging level for ***EVs*** that operates on a dedicated 40- to 100-amp breaker (same kind used by a clothes dryer or stove) on a 208- or 240-volt AC circuit while drawing 6.2+ kW to supply 19+ miles of range gained per hour of charging.

LEVEL 3: Fast or rapid charging level for ***EVs*** that operates on a 60-amp or higher breaker on a 480-volt AC electric circuit or higher three-phase circuit with special grounding equipment and mounting on an equipment pad.