

# CALGreen EV Charging Infrastructure Update

**Prepared for:** *AIA Long Beach/South Bay*

**Presented by:** Grant Alpert

**Date Presented:** April 2026

# Agenda / Key Objectives / Next Steps

- **Provide overview of CALGreen process**
- **Highlights of Changes**
- **Examples**
- **Introduce Automatic Load Management Systems**
- **Next Steps**

# California Building Standards Code (“Title 24”)

- PART 1 - ADMINISTRATIVE
- PART 2 - BUILDING
- PART 2.5 - RESIDENTIAL
- PART 3 - ELECTRICAL
- PART 4 - MECHANICAL
- PART 5 - PLUMBING
- PART 6 - ENERGY
- PART 7 - VACANT
- PART 8 - HISTORICAL BUILDING
- PART 9 - FIRE
- PART 10 - EXISTING BUILDING
- PART 11 - GREEN BUILDING STANDARDS (CALGREEN)
- PART 12 - REFERENCE STANDARD



- CHAPTER 1 - ADMINISTRATION
- CHAPTER 2 - DEFINITIONS
- CHAPTER 3 - GREEN BUILDING
- CHAPTER 4 - RESIDENTIAL MANDATORY MEASURES
- CHAPTER 5 - NONRESIDENTIAL MANDATORY MEASURES
- CHAPTER 6 - REFERENCED ORGANIZATIONS AND STANDARDS
- CHAPTER 7 - INSTALLER AND SPECIAL INSPECTOR QUALIFICATIONS
- CHAPTER 8 - COMPLIANCE FORMS, WORKSHEETS AND REFERENCE MATERIALS
- APPENDIX A4 - RESIDENTIAL VOLUNTARY MEASURES
- APPENDIX A5 - NONRESIDENTIAL VOLUNTARY MEASURES
- APPENDIX A6.1 VOLUNTARY STANDARDS FOR HEALTH FACILITIES

## Key Adopting Agencies

CA Building Standards Commission (**BSC**) oversees entire process



Department of Housing and Community Development (**HCD**)

**BSC** is primary lead.  
**DSA** is lead for public k-12 and CCs.



## Key Agency for EV Infrastructure Proposals



CARB is authorized by statute to provide proposals for CALGreen. Have been involved in submitting EV infrastructure proposals since 2013 code cycle.

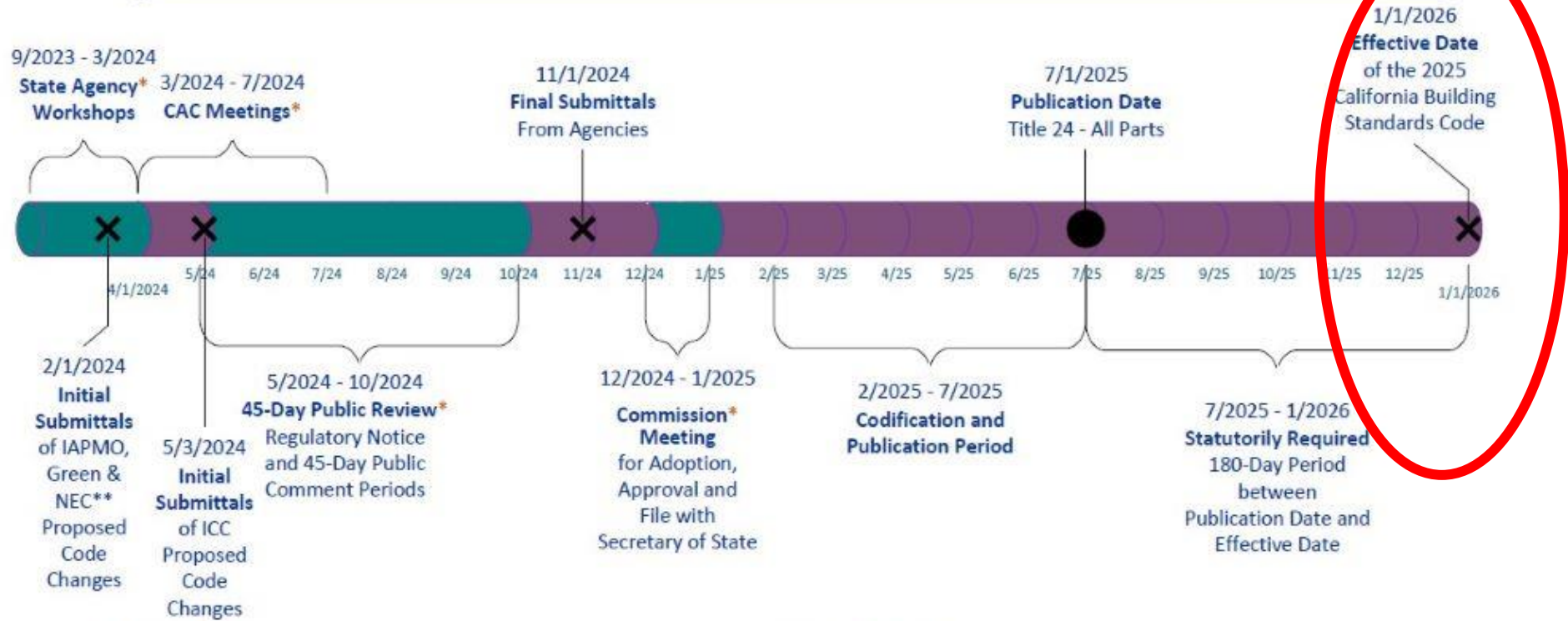
Same as Chapter 4

Same as Chapter 5

**DSA** = Division of State Architect



# 2024 Triennial Code Adoption Cycle



**Code Advisory Committees (CAC):**  
 ACCESS – Accessibility  
 BFO – Building, Fire & Other  
 GREEN – Green Building  
 HF – Health Facilities  
 PEME – Plumbing, Electrical, Mechanical & Energy  
 SDLF – Structural Design/Lateral Forces

**Model Code Publishers:**  
 ICC – International Code Council  
 IAPMO – International Association of Plumbing and Mechanical Officials  
 NFPA – National Fire Protection Association  
 \*\*NEC resubmittal if necessary

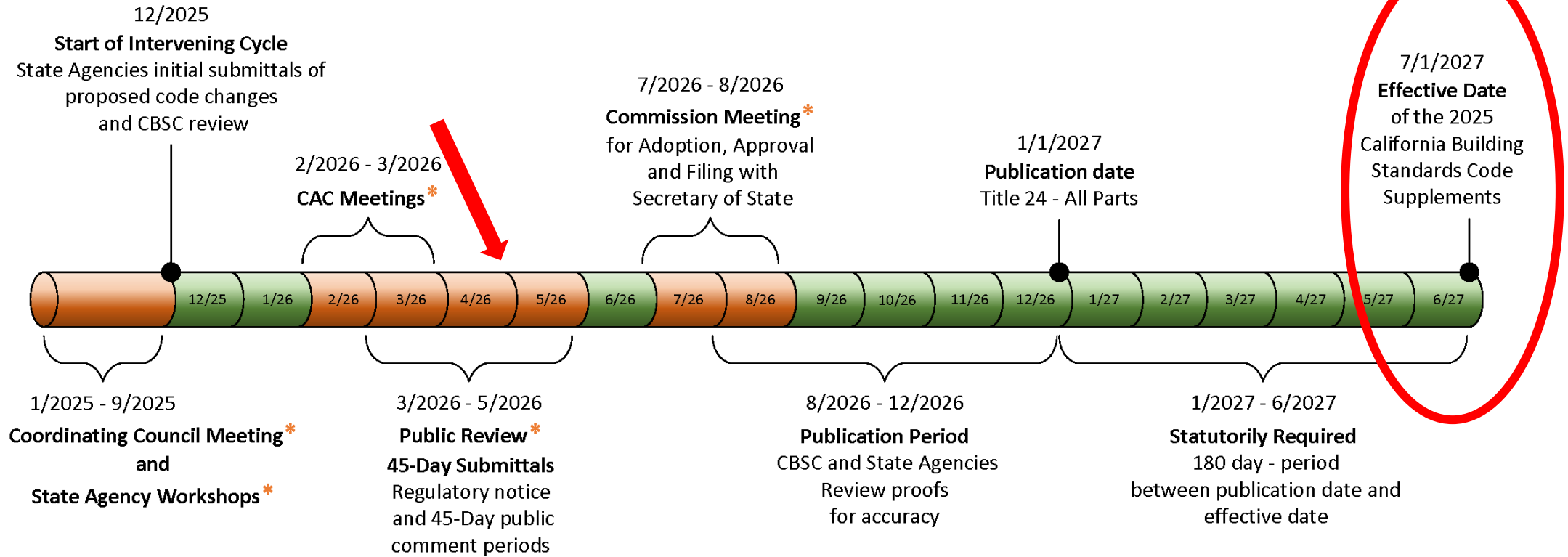
\* Public Participation Opportunity

# 2025 Intervening Code Adoption Cycle

California Building Standards Commission

Amendments to the 2025 California Building Standards Code,  
Title 24 Supplement July 1, 2027 Effective Date

\* Public Participation Opportunity



# What's next?

Nothing for Residential! (until 2031) due to AB 130


**California freezes local residential building standards under AB 130**

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**What's Frozen?**

	<b>State &amp; Local Amendments</b> <ul style="list-style-type: none"><li>▪ California Building Standards Code</li><li>▪ California Green Building Standards Code</li></ul>		<b>Local Ordinances</b> <p>Imposing Stricter:</p> <ul style="list-style-type: none"><li>▪ Construction standards</li><li>▪ Energy efficiency rules</li><li>▪ Occupancy regulations</li></ul>		<b>Post-Entitlement Changes</b> <p>Unless they:</p> <ul style="list-style-type: none"><li>▪ Lower costs</li><li>▪ Improve efficiency</li></ul>
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# Where is the latest CALGreen EV?

**2025 California Green Building Standards Code, Title 24, Part 11** 

Effective Date: Jan 01, 2026

Version: Jul 2025 ▼

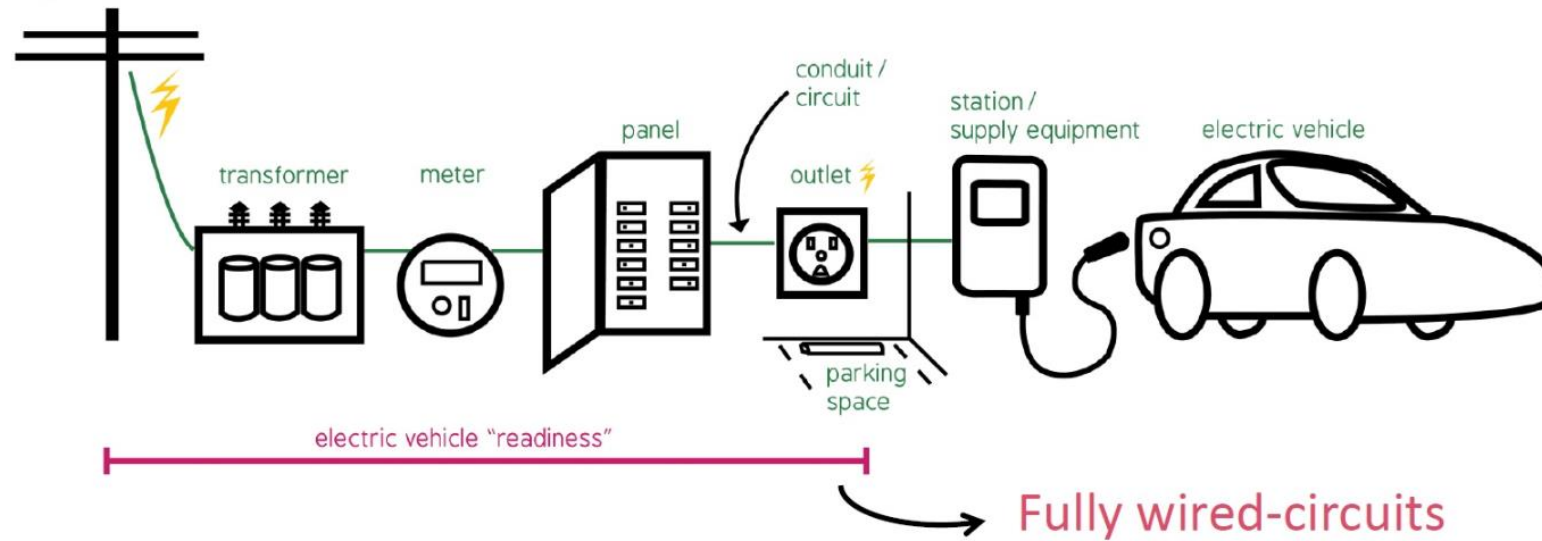
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**CONTENTS**  **NOTES**

➤ 5.106.5 Electric Vehicle (Ev) Charging.

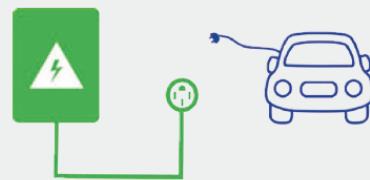
[https://codes.iccsafe.org/content/CAGBC2025P2/chapter-5-nonresidential-mandatory-measures#CAGBC2025P2\\_Ch05\\_SubCh5.1\\_Sec5.106.5](https://codes.iccsafe.org/content/CAGBC2025P2/chapter-5-nonresidential-mandatory-measures#CAGBC2025P2_Ch05_SubCh5.1_Sec5.106.5)

# Example layout for EV charging infrastructure and the three levels of “Readiness”



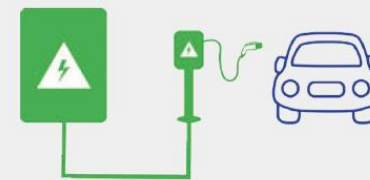
## EV Capable

EV space that has the electrical panel capacity and conduit, called raceway, installed to implement EV charging in the future.



## EV Ready

EV space that has circuit installations and panel capacity, raceway with wiring, receptacle, and circuit overprotection devices.



## EV Installed

EVSE fully installed from the electrical panel to the EV space.

# EV Charging Infrastructure Examples

EV Capable Space	EV Ready - Low Power Level 2 Receptacle	EVSE - Level 2 EV Supply Equipment (aka EV Charger)	DC Fast Charger
<p>208/240 Volts, 40 Amp capacity, with empty conduit ready for wire</p>	<p>208/240 Volts, 20 Amp circuit (minimum), 16 A charging capacity, terminating in a receptacle</p>	<p>208/240 Volts, 40 Amp circuit (minimum), 32 A max charging capacity, terminating in an EVSE</p>	<p>277/480 Volts, 50-350 kVA charging capacity</p>
 <p><small>Image courtesy of Electricity America</small></p>			

# CALGreen EV 2024 Highlights for: New Construction

## Non-Residential

1. No increase in overall EV Spaces
2. Increasing the mix of EVSE-Installed spaces (2x, 3x for Office & Retail)
3. EVSE-Installed spaces can support new NACS (SAE J3400/Tesla) connector and allowing 277V for some spaces.
4. Increasing raceway size for future 40A branch-circuit conductors

## Multifamily

1. Increasing from 40% coverage to one low-power Level 2 EV Space per unit
2. Assigned-space parking lots must connect EV Space to dwelling unit's panel, unless infeasible
3. EVSE-Installed spaces increase from 10% to 25%, and support NACS (SAE J3400/Tesla) connector
4. Automated Load Management Systems allowed

## Hotels

1. Continuing with 40% low-power level 2 EV Spaces
2. EVSE-Installed spaces increase from 10% to 25%, and support J3400 connector

### References

- Final Dec 2024 Meeting page: <https://www.dgs.ca.gov/BSC/Rulemaking/2024-Triennial-Cycle/Commission-Mtgs>
- BSC's Final Express Terms (Non-Residential) ([link](#))
- HCD's Final Express Terms (Multifamily) ([link](#))

# CALGreen EV 2025 Proposed Change Highlights for: Altered or Added Parking Spaces

## Non-Residential Pre-Existing Power Usage

When EV capable infrastructure is available at an existing parking facility or building, and the parking facility or building is undergoing an addition or alteration... Install EVCS at all existing EV capable spaces, utilizing the existing EV-capable allocated power and infrastructure for the total number of actual parking spaces being added or altered, prior to adding any new EV capable spaces.

## Solar Covered Parking

Update: In 2025 Intervening Code Adoption Cycle, clarifications are being made to the covered parking requirements. Only newly covered or newly created spaces shall count toward the EV charging requirements.



2. When a new photovoltaic system is installed covering existing parking spaces. All newly covered parking spaces shall count toward the EV charging requirements as applicable.
3. When additions or alterations to existing buildings are triggered pursuant to code Section 301.3 and the scope of work ~~includes an increase in power supply to an electric service panel~~ results in a required increase in the number of parking spaces. All newly added parking spaces shall count toward the EV charging requirements as applicable.

Source: <https://www.dgs.ca.gov/BSC/Rulemaking/2025-Intervening-Cycle/PreCycle>, CALGreen Electric Vehicle Workgroup, Draft Item 2c

# 2025 CALGreen Non-Residential buildings (Ch. 5) required EV spaces – Space Allocation Method

**TABLE 5.106.5.3.1 – EV CAPABLE SPACES AND EVCS**

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	OTHER THAN OFFICE AND RETAIL NUMBER OF REQUIRED EVCS <sup>2, 3</sup>	OFFICE AND RETAIL NUMBER OF REQUIRED EVCS <sup>2, 3</sup>
1–9	0	0	0
10–25	4	2	3
26–50	8	4	6
51–75	13	6	8
76–100	17	8	13
101–150	25	12	19
151–200	35	18	26
201 and over	20 percent of actual parking spaces <sup>1</sup>	50 percent of EV capable spaces <sup>1</sup>	75 percent of EV capable spaces <sup>1</sup>

1. Calculation for spaces shall be rounded up to the nearest whole number.
2. Each EVCS shall reduce the number of required EV capable spaces by the same number.
3. At least one Level 2 EVSE shall be provided.

# Key Intervening Cycle Non-Residential Updates

## 1. Space Quantity method (unchanged)

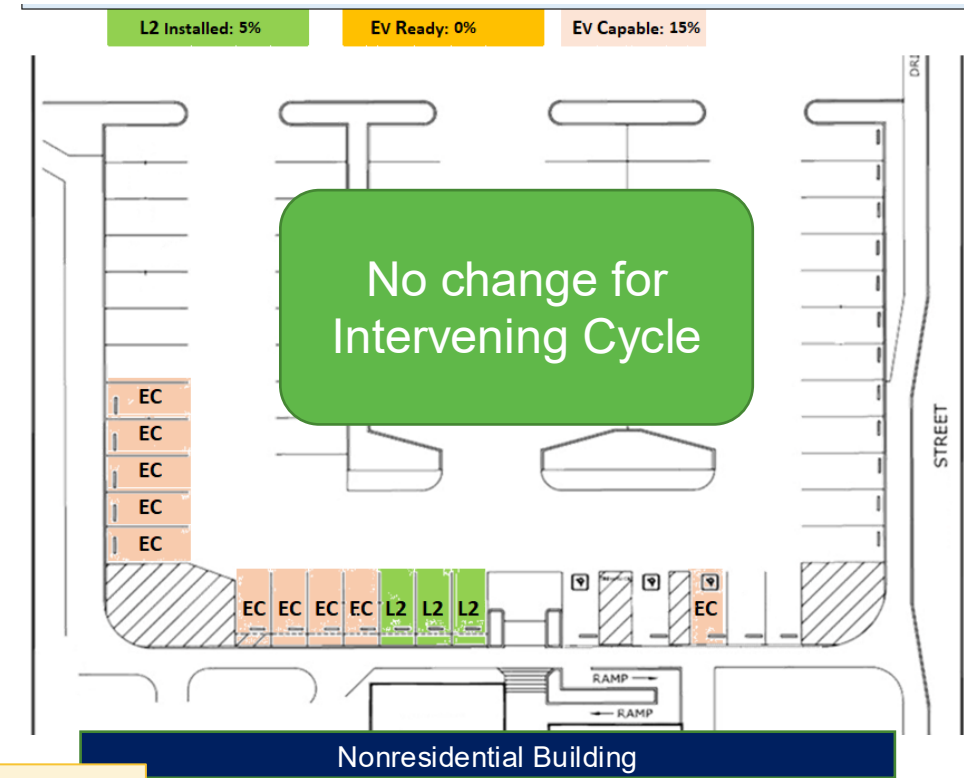
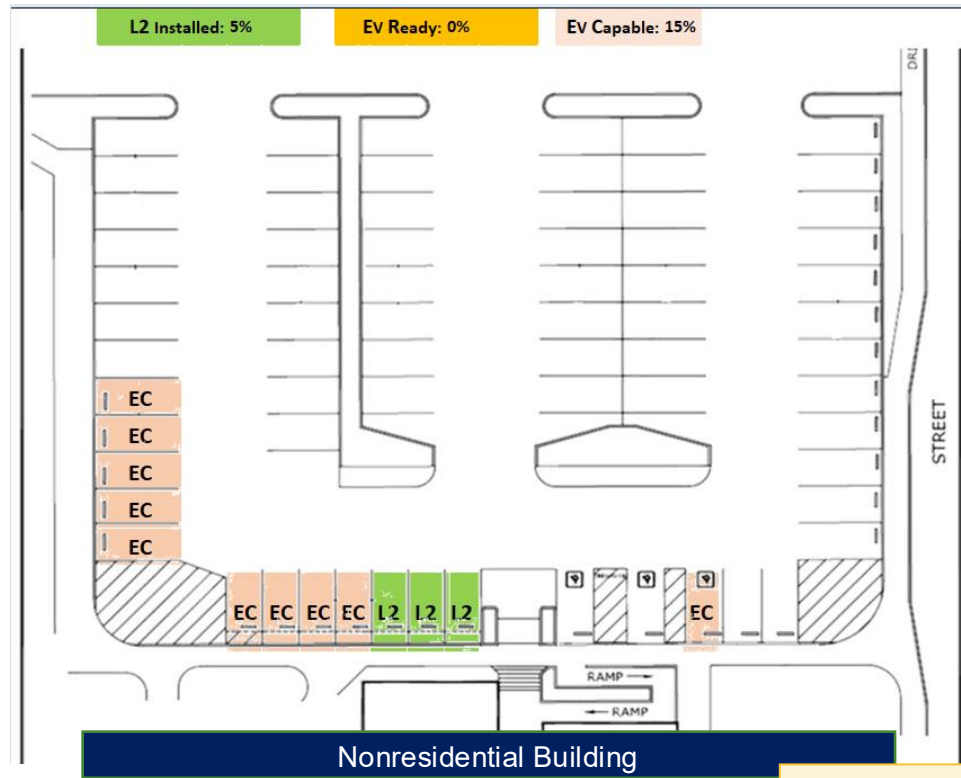
- One DC Fast Charger can replace five EV Capable or five L2 EVSE.
- Two Low Power Level 2 EV Charging Receptacles can replace one EV Capable space.

## 2. Power Allocation method (new!)

## 3. New construction requirements apply for existing buildings or parking facilities being modified by one of the following:

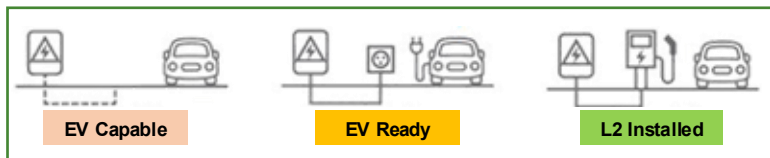
- Increase in power supply to an electric service panel as part of a parking facility addition or alteration.
- New photovoltaic system is installed covering existing parking spaces.
- Must utilize any preexisting EV Capable power and infrastructure
- Exceptions available

# Mandatory Non-Residential New Construction 2022 CALGreen (eff. 1/1/23) vs. 2025 CALGreen (eff. 1/1/26)



Example: 69 parking spaces

- L2** = L2 EVSE Installed (Level 2 208/240V 40A)
- ER** = EV Ready (receptacle) (low power Level 2 208/240V 20A)
- EC** = EV Capable (panel space and electrical load capacity for a future EVSE Space 208/240V 40A)



Note: this slide is intended to illustrate a general code requirement scenario and does not reflect the full nuance of code language.

# 2025 CALGreen Non-Residential buildings (Ch. 5) required EV spaces – Power Allocation Method

TABLE 5.106.5.3.6-EVCS—POWER ALLOCATION METHOD

TOTAL NUMBER OF ACTUAL PARKING SPACES	MINIMUM TOTAL kVA @ 6.6 kVA	OTHER THAN OFFICE AND RETAIL TOTAL kVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>3,4</sup> , LOW POWER LEVEL 2, LEVEL 2 <sup>1,2</sup> , OR DCFC	OFFICE AND RETAIL TOTAL kVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>4,5</sup> , LOW POWER LEVEL 2, LEVEL 2 <sup>1,2</sup> , OR DCFC
1–9	0	0	0
10–25	26.4	26.4	26.4
26–50	52.8	52.8	52.8
51–75	85.8	85.8	85.8
76–100	112.2	112.2	112.2
101–150	165	165	165
151–200	231	231	231
201 and over	20 percent of actual parking spaces × 6.6	Total required kVA = P × .20 × 6.6 Where P = Parking spaces in facility	Total required kVA = P × .20 × 6.6 Where P = Parking spaces in facility

- 20% of the spaces each contribute 6.6kW to the budget. (40A circuit x 80% continuous duty x 208V)
- Must have one or more Level 2 EVSE
- EV Capable spaces are limited to 75% of the required capacity
- Low Power Level 2 EV Charging Receptacles are now an option.

1. Level 2 EVSE @ 6.6 kVA minimum.
2. At least one Level 2 EVSE shall be provided.
3. Maximum allowed kVA to be utilized for EV capable spaces is 75 percent.
4. If EV capable spaces are utilized, they shall meet the requirements of Section 5.106.5.3.1 EV capable spaces.
5. For office and retail buildings the maximum allowed kVA to be utilized for EV capable spaces is 25 percent.

# New Power Allocation Method – more spaces, more power...

Total Power: 69 Spaces x 20% x 6.6 kW = 91.1 kW (use 85.8 kW per table 5.106.5.3.6)

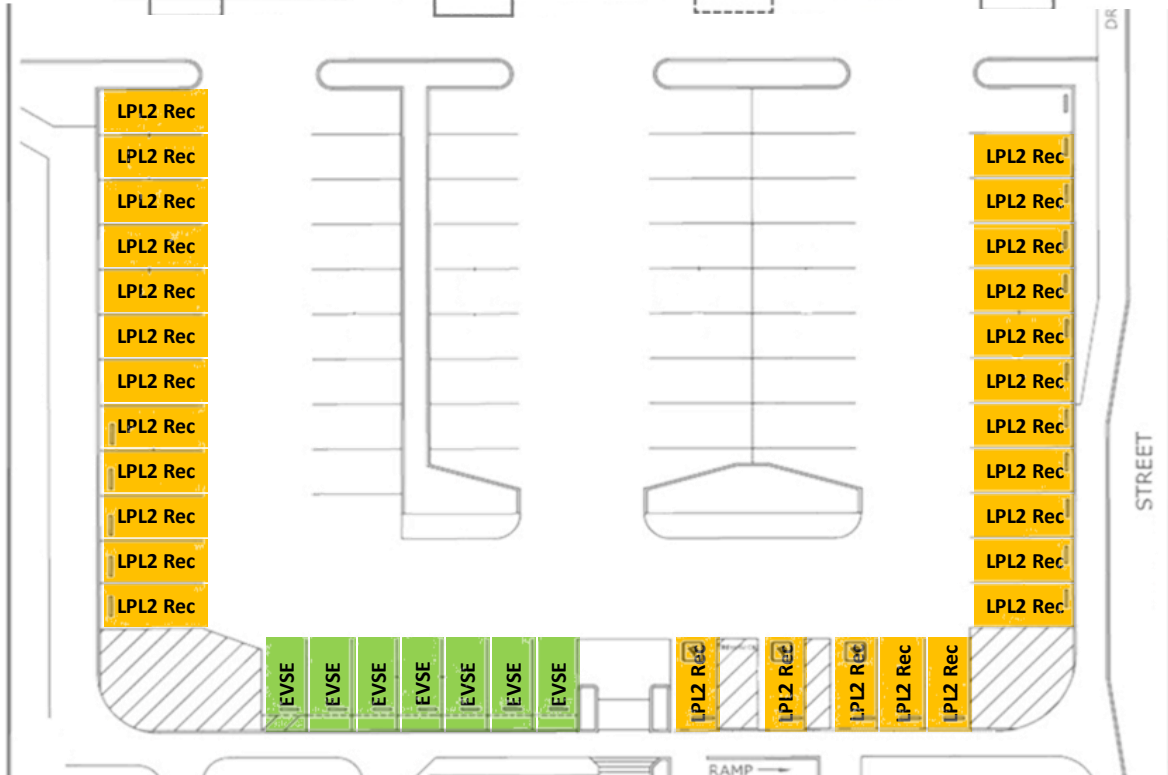
Scenario: 2022 CALGreen (eff 7/1/24) Multifamily with 35 total EV Spaces

EVSE: 10.0%

LPL2 Rec: 40.0%

EV Capable: 0%

DCFC: 0.0%



Total Power: 69 Spaces x 20% x 6.6 kW = 91.1 kW (use 85.8 kW per table 5.106.5.3.6)

Scenario: 2022 CALGreen (eff 7/1/24) Non-Residential with 13 total EV Spaces

EVSE: 5.0%

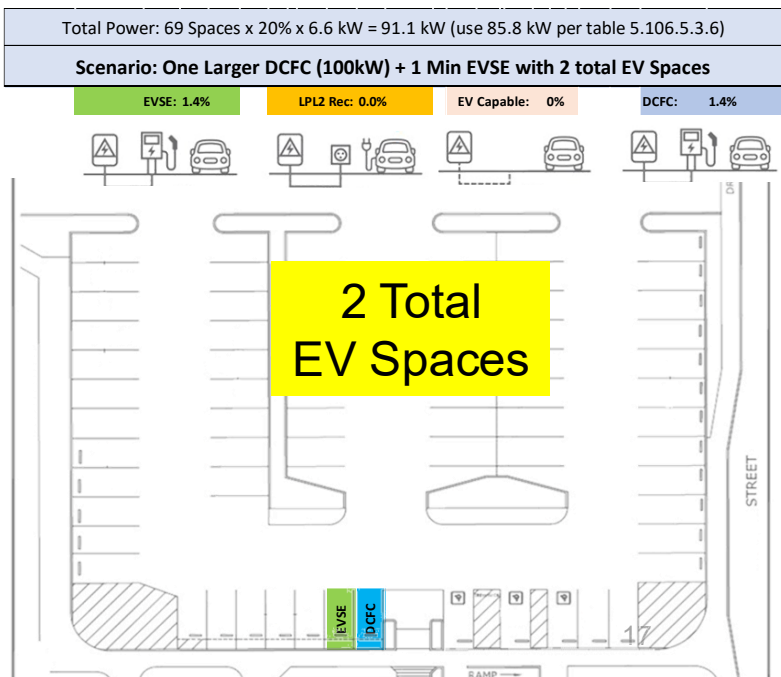
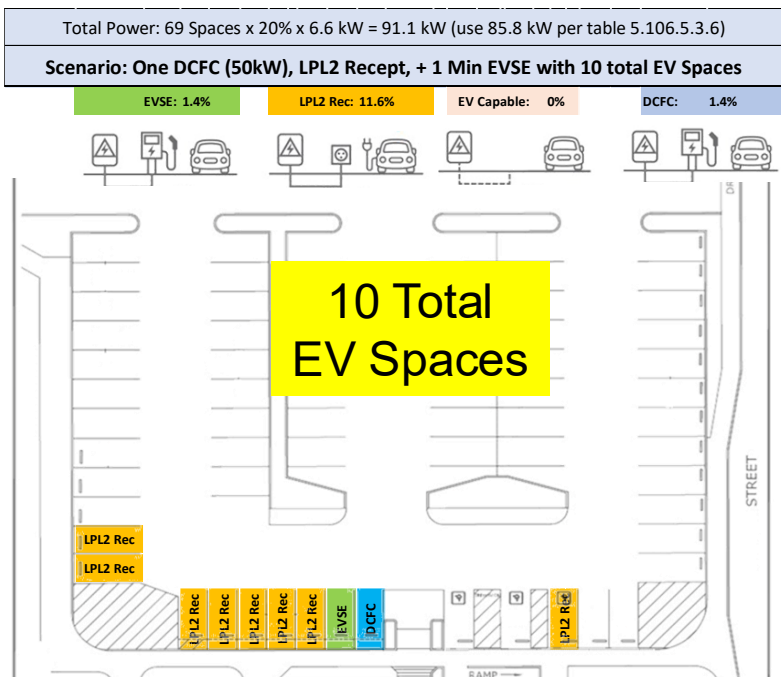
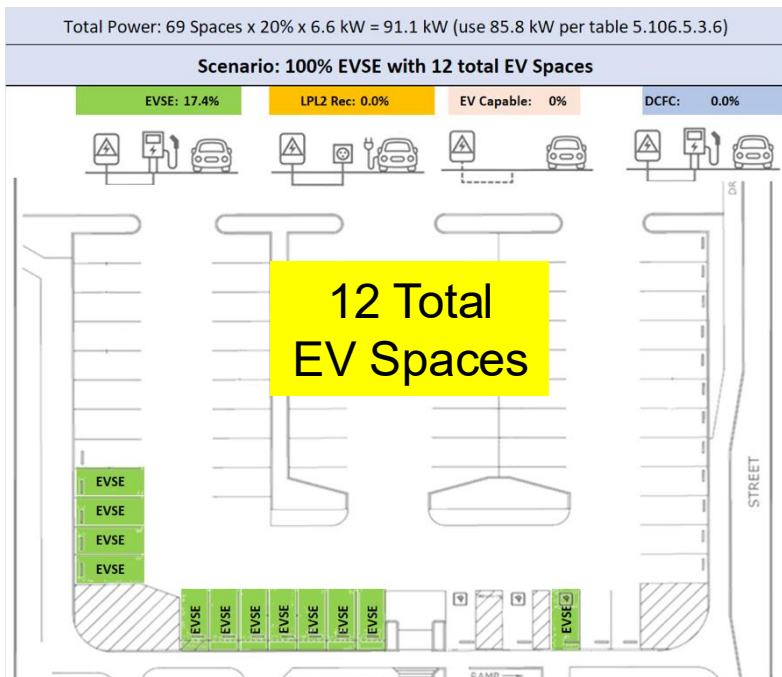
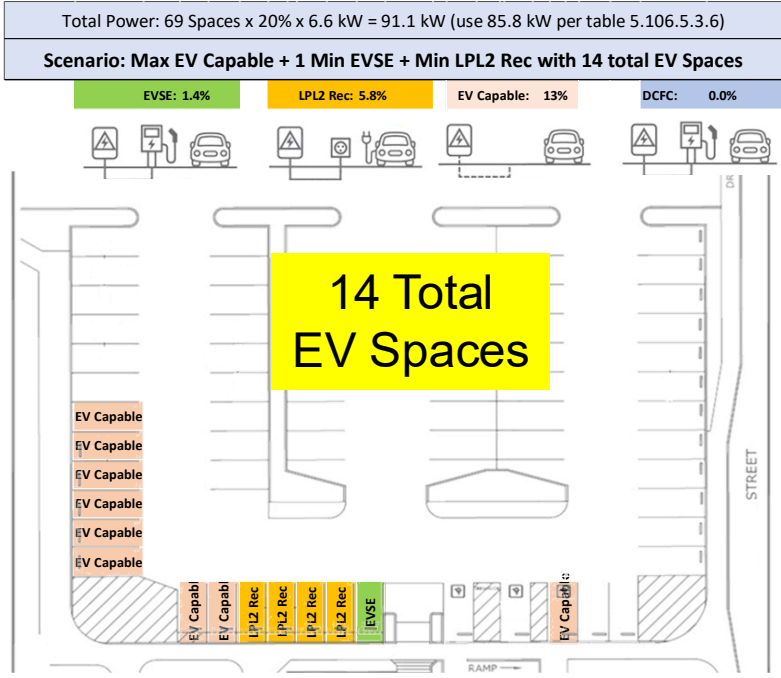
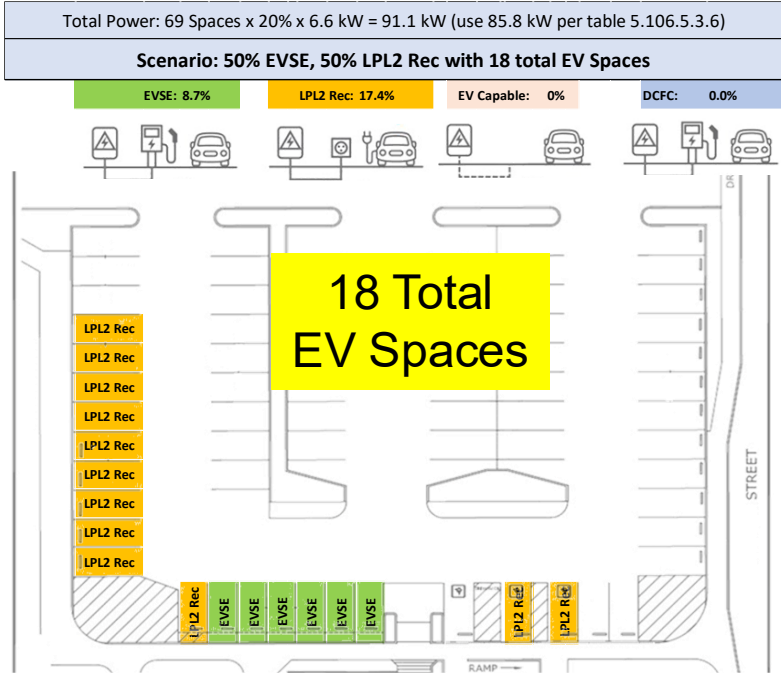
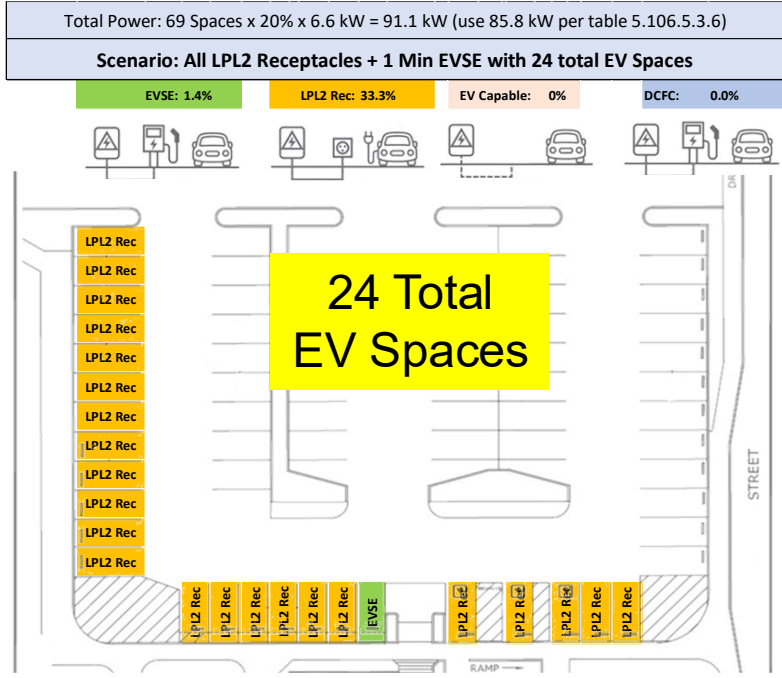
LPL2 Rec: 0.0%

EV Capable: 15%

DCFC: 0.0%

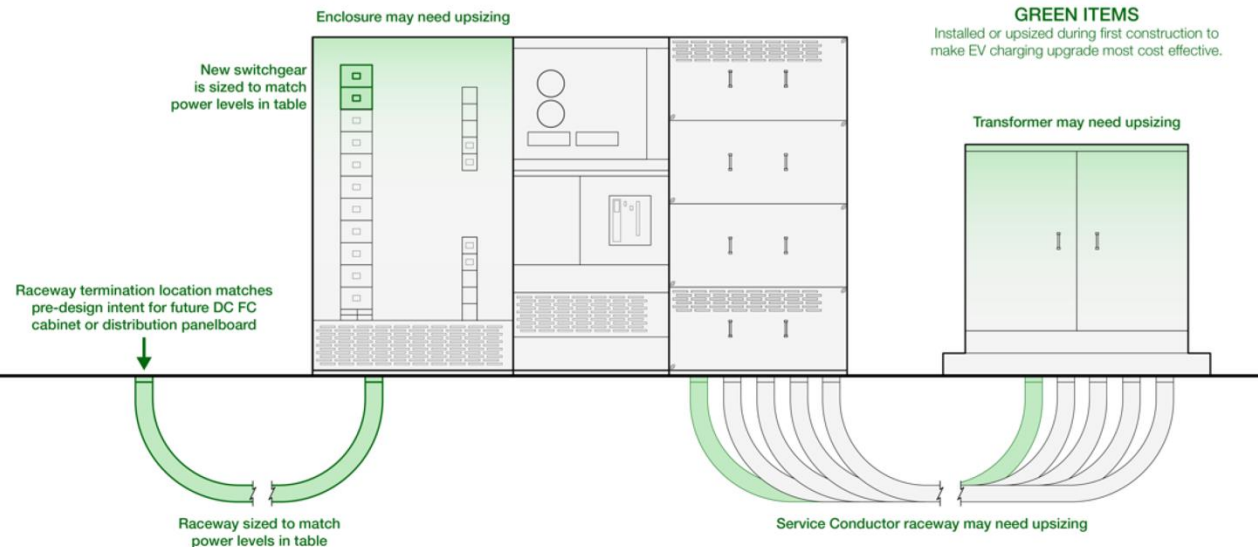


# Owner's Choice! Power Allocation Method Examples for Non-Residential – From 24 EV Spaces to 2 EV Spaces



# 2025 CALGreen for Medium-/Heavy-Duty EV-Ready requirements for buildings with off-street loading spaces

- 2025 CALGreen effective 1/1/26 requires that spare raceway(s) or busway(s) and adequate capacity for transformer(s), service panel(s) or subpanel(s) shall be installed at the time of construction to facilitate future installation of EVSE, and avoid costly demolitions
- In the figure below, green items included during new construction are sized to cost-effectively enable future installation of MHD EV charging equipment for retail, warehouse and grocery building types.



**TABLE 5.106.5.-4-5.1, RACEWAY CONDUIT AND PANEL POWER REQUIREMENTS FOR MEDIUM-AND-HEAVY-DUTY EVSE [N]**

Building type	Building Size (sq. ft.)	Number of Off-street loading spaces	Additional capacity Required (kVa) for Raceway & Busway and Transformer & Panel
Grocery	10,000 to 90,000	1 or 2	200
		3 or Greter	400
	Greater than 90,000	1 or Greter	400
Retail	10,000 to 135,000	1 or 2	200
		3 or Greater	400
	Greater than 135,000	1 or Greater	400
Warehouse	20,000 to 256,000	1 or 2	200
		3 or Greater	400
	Greater than 256,000	1 or Greater	400
Manufacturing Facilities	10,000 to 50,000	1 or 2	200
		3 or Greater	400
	Greater than 50,000	1 or Greater	400
Office Buildings	10,000 to 135,000	1 or 2	200
		3 or Greater	400
	Greater than 135,000	1 or Greater	400

New Building Types Added for 7/1/2024

# Voluntary Non-Residential EV Parking

TABLE A5.106.5.3.1 — TIER 1 EV CAPABLE SPACES AND EVCS

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	OTHER THAN OFFICE AND RETAIL NUMBER OF REQUIRED EVCS <sup>2, 3</sup>	OFFICE AND RETAIL NUMBER OF REQUIRED EVCS <sup>2, 3</sup>
1–9	2	1	2
10–25	5	3	4
26–50	11	6	8
51–75	19	10	14
76–100	26	13	20
101–150	38	19	29
151–200	53	27	40
201 and over	30 percent of actual parking spaces <sup>1</sup>	50 percent of EV capable spaces <sup>1</sup>	75 percent of EV capable spaces <sup>1</sup>

1. Calculation for spaces shall be rounded up to the nearest whole number.
2. Each EVCS shall reduce the number of required EV capable spaces by the same number.
3. At least one Level 2 EVSE shall be provided.

TABLE A5.106.5.3.2 — TIER 1 EVCS—POWER ALLOCATION METHOD

TOTAL NUMBER OF ACTUAL PARKING SPACES	MINIMUM TOTAL KVA @ 6.6 kVA	OTHER THAN OFFICE AND RETAIL TOTAL KVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>3, 4</sup> , LOW POWER LEVEL 2LEVEL 2 <sup>1, 2</sup> , OR DCFC	OFFICE AND RETAIL TOTAL KVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>3, 4</sup> , LOW POWER LEVEL 2LEVEL 2 <sup>1, 2</sup> , OR DCFC
1–9	13.2	13.2	13.2
10–25	33	33	33
26–50	72.6	72.6	72.6
51–75	125.4	125.4	125.4
76–100	171.6	171.6	171.6
101–150	250.8	250.8	250.8
151–200	349.8	349.8	349.8
201 and over	30 percent of actual parking spaces × 6.6	Total required kVA = P × .30 × 6.6 Where P = Parking spaces in facility	Total required kVA = P × .30 × 6.6 Where P = Parking spaces in facility

1. Level 2 EVSE @ 6.6 kVA minimum.
2. At least one Level 2 EVSE shall be provided.
3. Maximum allowed kVA to be utilized for EV capable spaces is 67 percent.
4. If EV capable spaces are utilized, they shall meet the requirements of Section 5.106.5.3.1 EV capable spaces.
5. For office and retail buildings the maximum allowed kVA to be utilized for EV capable spaces is 25 percent.

TABLE A5.106.5.3.3 — TIER 2 EV CAPABLE SPACES AND EVCS

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	OTHER THAN OFFICE AND RETAIL NUMBER OF REQUIRED EVCS <sup>2, 3</sup>	OFFICE AND RETAIL NUMBER OF REQUIRED EVCS <sup>2, 3</sup>
1–9	3	2	2
10–25	8	4	6
26–50	17	9	13
51–75	28	14	21
76–100	40	20	30
101–150	57	29	43
151–200	79	40	59
201 and over	45 percent of actual parking spaces <sup>1</sup>	50 percent of EV capable spaces <sup>1</sup>	75 percent of EV capable spaces <sup>1</sup>

1. Calculation for spaces shall be rounded up to the nearest whole number.
2. Each EVCS shall reduce the number of required EV capable spaces by the same number.
3. At least one Level 2 EVSE shall be provided.

TABLE A5.106.5.3.4 — TIER 2 EVCS—POWER ALLOCATION METHOD

TOTAL NUMBER OF ACTUAL PARKING SPACES	MINIMUM TOTAL KVA @ 6.6 kVA	OTHER THAN OFFICE AND RETAIL TOTAL KVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>3, 4</sup> , LOW POWER LEVEL 2LEVEL 2 <sup>1, 2</sup> , OR DCFC	OFFICE AND RETAIL TOTAL KVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>3, 4</sup> , LOW POWER LEVEL 2LEVEL 2 <sup>1, 2</sup> , OR DCFC
1–9	19.8	19.8	19.8
10–25	52.8	52.8	52.8
26–50	112.2	112.2	112.2
51–75	184.8	184.8	184.8
76–100	264.0	264	264
101–150	376.2	376.2	376.2
151–200	521.4	521.4	521.4
201 and over	45 percent of actual parking spaces × 6.6	Total required kVA = P × .45 × 6.6 Where P = Parking spaces in facility	Total required kVA = P × .45 × 6.6 Where P = Parking spaces in facility

1. Level 2 EVSE @ 6.6 kVA minimum.
2. At least one Level 2 EVSE shall be provided.
3. Maximum allowed kVA to be utilized for EV capable spaces is 75 percent.
4. If EV capable spaces are utilized, they shall meet the requirements of Section 5.106.5.3.1 EV capable spaces.
5. For office and retail buildings the maximum allowed kVA to be utilized for EV capable spaces is 25 percent.

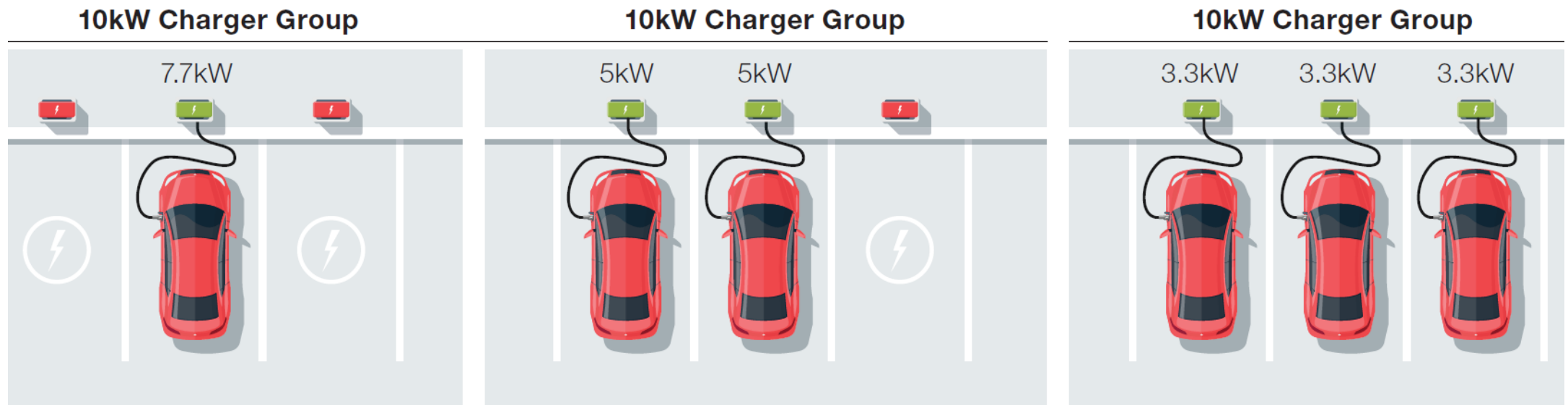


# Automatic Load Management System (ALMS)

As more vehicles and fleets transition to electric, buildings often do not have the capacity to simultaneously charge large numbers of electric vehicles (EV).

Upgrading a building's electrical systems can be impractical and expensive. An automatic load management system (ALMS) manages EV charging to reduce the combined electrical load, allowing capacity to be shared among several vehicles.

In this example, 10kW of charging power is shared among three chargers.



# What are the benefits of ALMS?

- **Capacity Management**

- Maximizes the number of EV chargers when faced with limited building capacity. More chargers mean users don't have to move their car to share a charger.
- Reduces upstream capacity requirements of existing buildings (and possibly utility service). Rightsizing capacity may avoid stranded assets.

- **Energy Management**

- Decreases or increases the capacity allocated to EV charging based on strategies to:
  - Control demand charges
  - Avoid higher time-of-use electricity costs
  - Participate in utility's demand response programs
  - Shift charging loads to green generation periods

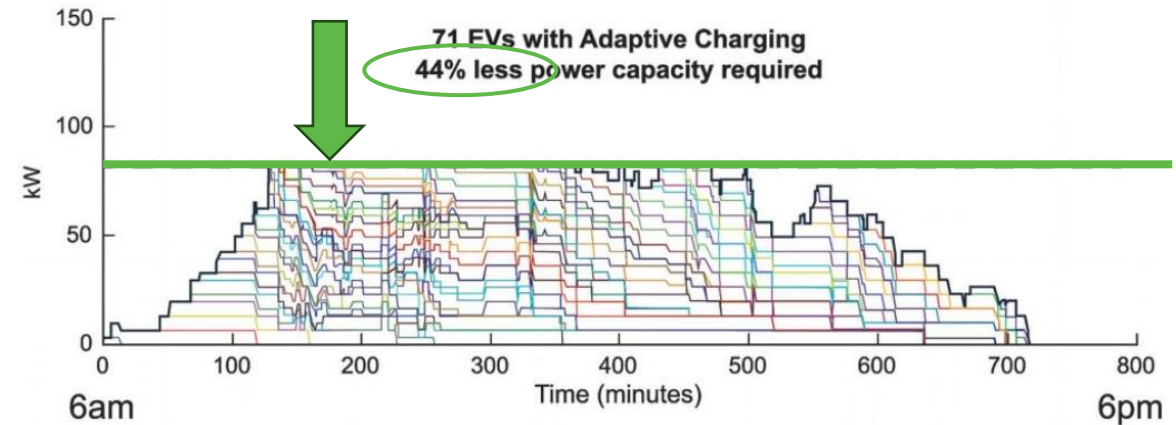
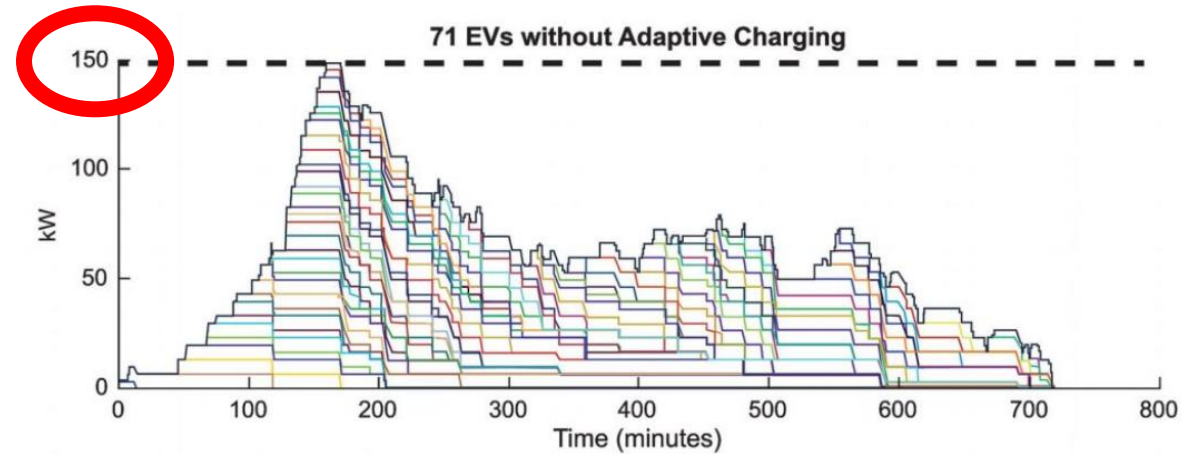


Image: [PowerFlex](#)

# 120 Space Example

## w/208V Transformer

### Spaces Table [5.106.5.3.1:](#)

25 EV Spaces

EVSE-Installed: 6

EV-Capable: 25-6 = 19

### Power Allocation Table [5.106.5.3.6:](#)

165 kW power budget (~20% x spaces x 6.6kW)

TABLE 5.106.5.3.1

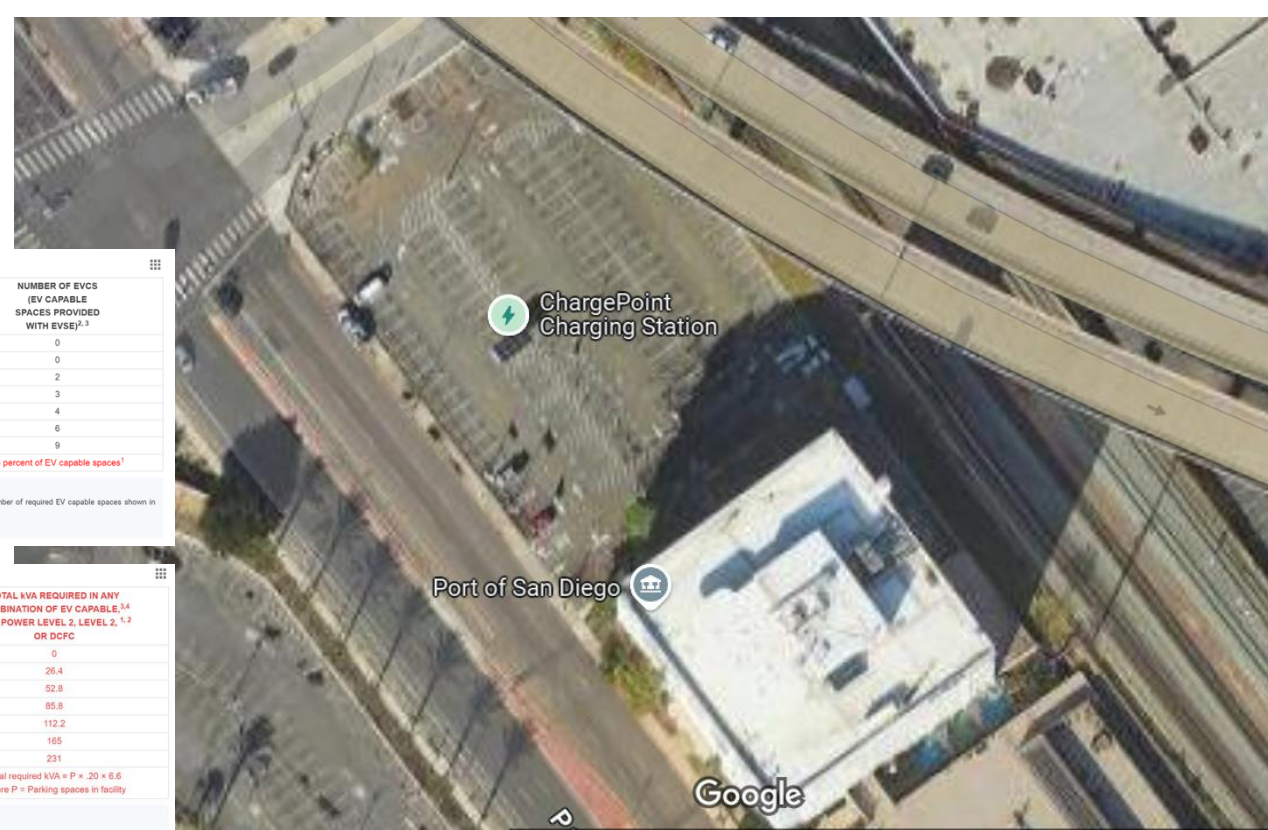
TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	NUMBER OF EVCS (EV CAPABLE SPACES PROVIDED WITH EVSE) <sup>2, 3</sup>
0-9	0	0
10-25	4	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 and over	20 percent of actual parking spaces <sup>1</sup>	25 percent of EV capable spaces <sup>1</sup>

1. Calculation for spaces shall be rounded up to the nearest whole number.  
 2. The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count toward the total number of required EV capable spaces shown in column 2.  
 3. At least one Level 2 EVSE shall be provided.

TABLE 5.106.5.3.6

TOTAL NUMBER OF ACTUAL PARKING SPACES	MINIMUM TOTAL kVA @ 6.6 kVA	TOTAL kVA REQUIRED IN ANY COMBINATION OF EV CAPABLE <sup>2, 4</sup> LOW POWER LEVEL 2, LEVEL 2, <sup>1, 2</sup> OR DCFC
0-9	0	0
10-25	26.4	26.4
26-50	52.8	52.8
51-75	85.8	85.8
76-100	112.2	112.2
101-150	165	165
151-200	231	231
201 and over	20 percent of actual parking spaces x 6.6	Total required kVA = P x .20 x 6.6 Where P = Parking spaces in facility

1. Level 2 EVSE @ 6.6 kVA minimum.  
 2. At least one Level 2 EVSE shall be provided.  
 3. Maximum allowed kVA to be utilized for EV capable spaces is 75 percent.  
 4. If EV capable spaces are utilized, they shall meet the requirements of Section 5.106.5.3.1 EV capable spaces.



EV-Capable Spaces: Use no more than 75% of the power (165kW x 75% = 124 kW), each space needs 30A x 208V = 6.24kW/space, 124/6.24 = **20 EV Capable Spaces max**

Other EV Spaces: No less than 25% of the power (165kW x 25% = 41kW)

1. Low Power Level 2 Receptacles – 20A x 80% x 208V = 3.3kW per space = 13 spaces
2. AC EVSEs – 30A equipment x 208V = 6.3kW per space = 7 spaces (Must always include at least one)
3. DC EVSE – 50kW (very small one!) = 1 space

Thank  
You !

Questions?

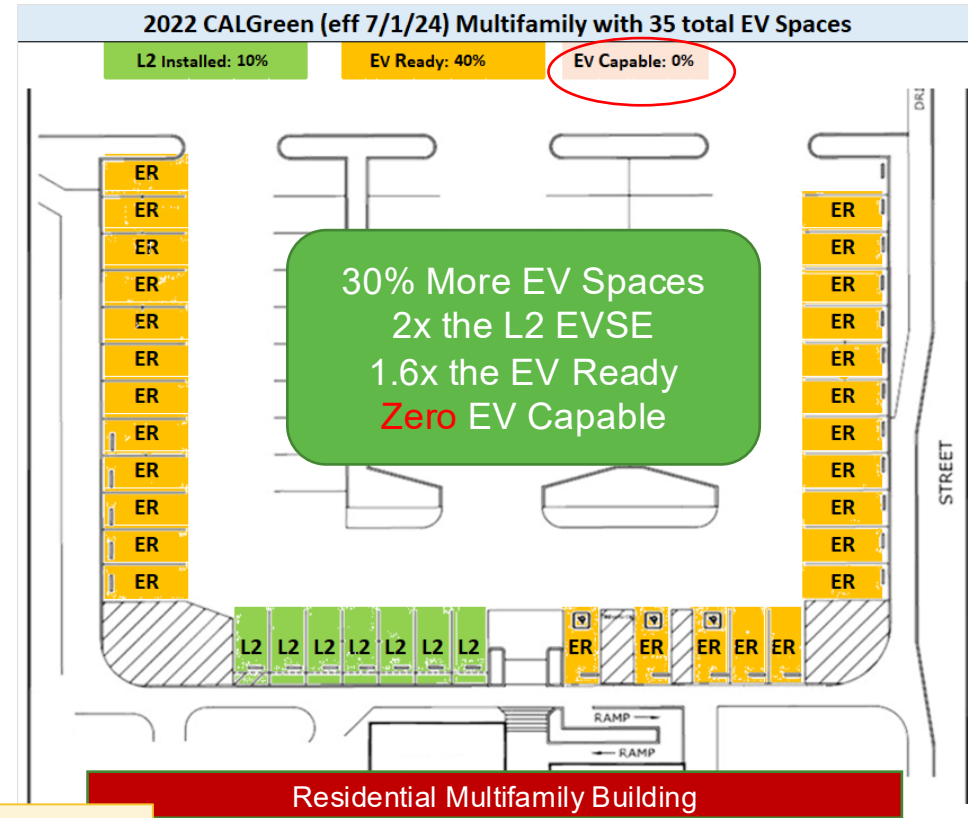
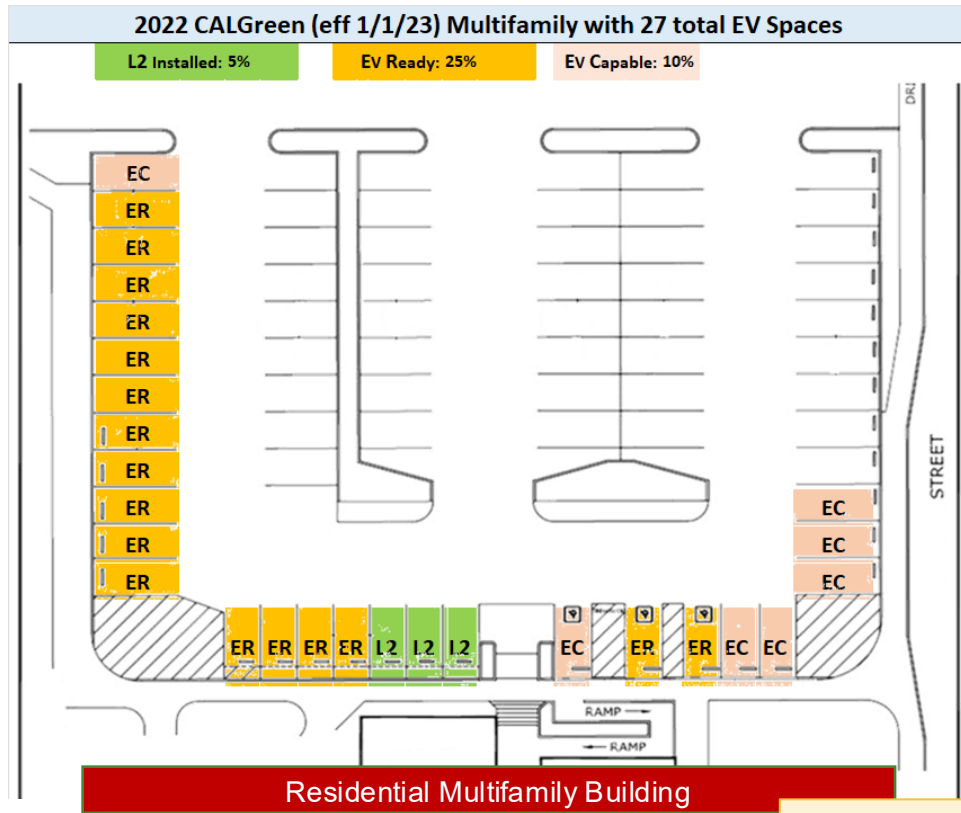
Grant Alpert

[galpert@westmonroe.com](mailto:galpert@westmonroe.com)



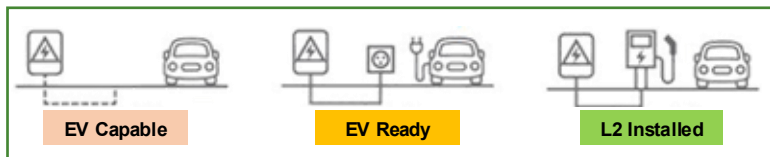
# APPENDIX

# Mandatory MF Residential New Construction (includes Hotels/Motels) 2022 CALGreen (eff. 1/1/23) vs. 2022 CALGreen Intervening cycle (eff. 7/1/24)



Example: 69 parking spaces

- L2** = L2 EVSE Installed (Level 2 208/240V 40A)
- ER** = EV Ready (receptacle) (low power Level 2 208/240V 20A)
- EC** = EV Capable (panel space and electrical load capacity for a future EVSE Space 208/240V 40A)



*Note:* this slide is intended to illustrate a general code requirement scenario and does not reflect the full nuance of code language.

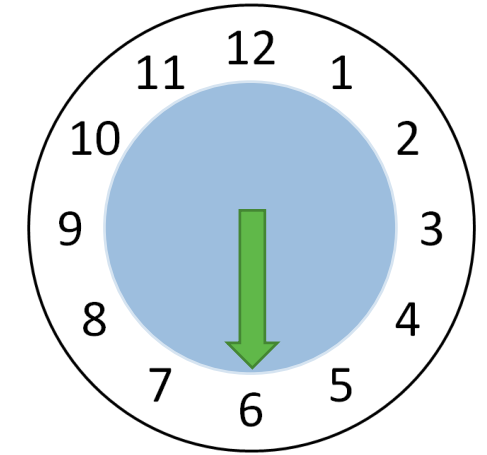
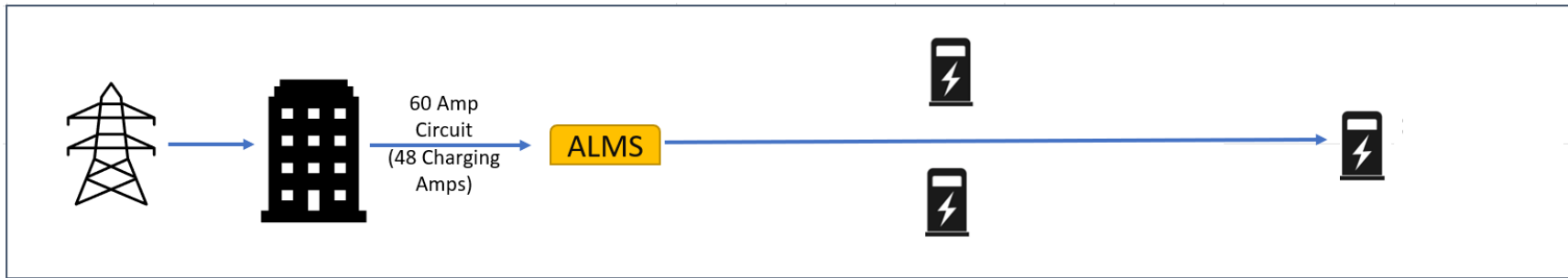
# “Day in the Life” of Automatic Load Management Systems

ALMS orchestrates charging sessions to protect building power distribution infrastructure and allocate charging rates based on other business rules.

ALMS can be smart EVSEs working together while other systems use a shared controller that also monitors power levels within the building power distribution infrastructure.

The following "for illustration only" example shows how a system could share a single circuit's current capacity (48 Amps continuous) across five charging spaces.

The example starts with an empty parking lot at 6am and finishes with fleet charging at 9pm.

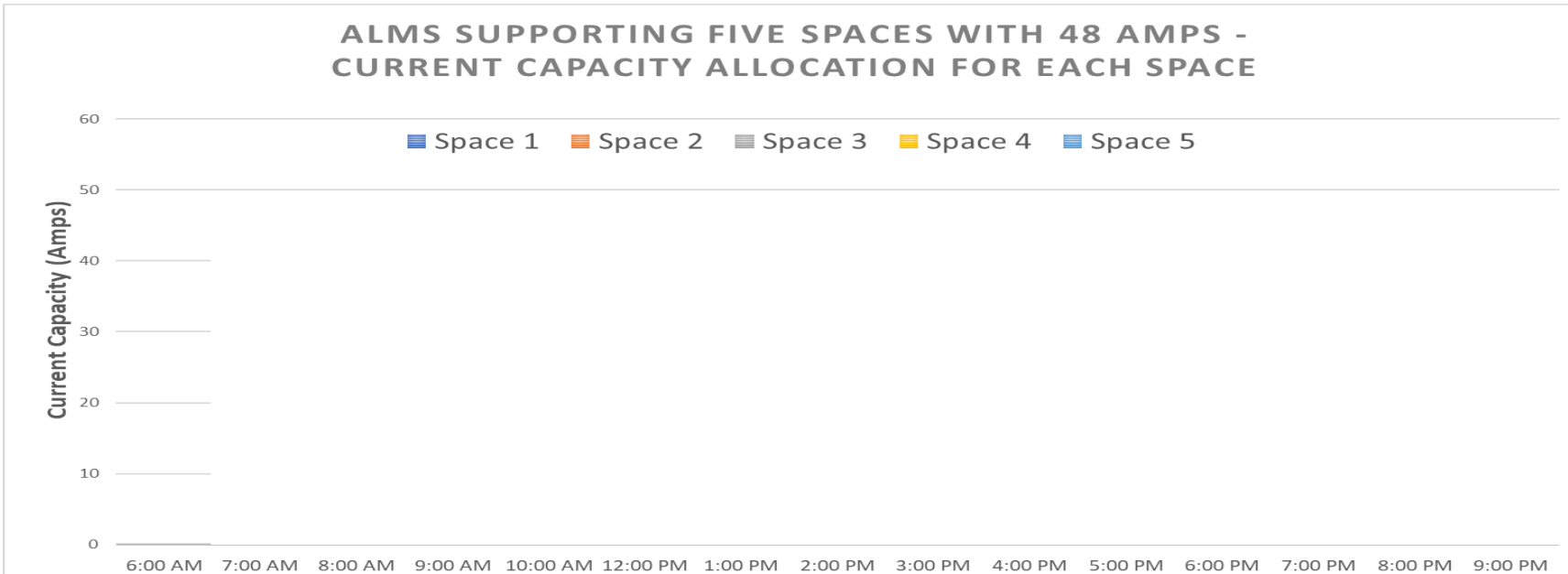


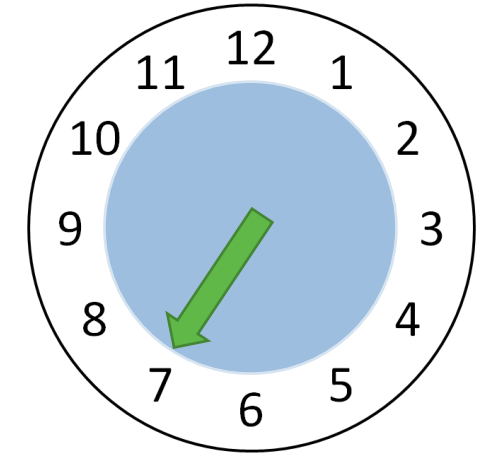
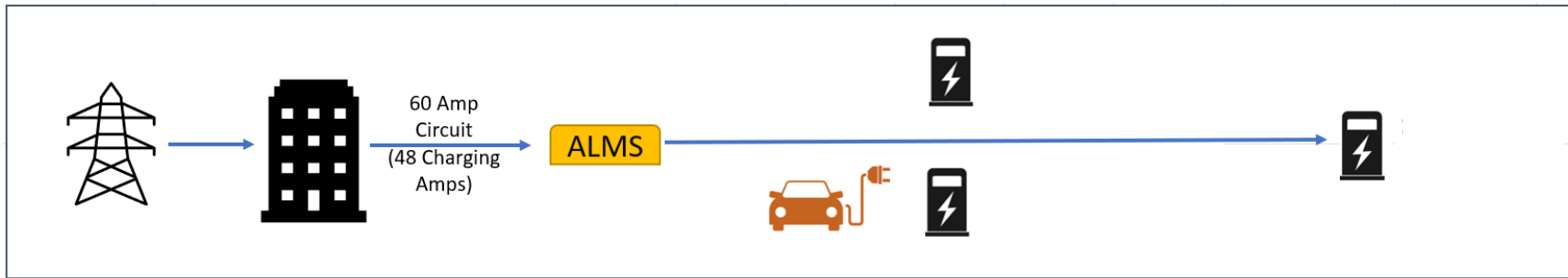
A Day in the Life of Five EV Charging Spaces Controlled by ALMS							Continuous Load Factor 125%	
(Charging sessions shortened for impact)							Total Available Panel Capacity (A)	Required Circuit Capacity
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
06:00 AM	Parking lot empty	Empty	Empty	Empty	Empty	Empty	0	48

Current Capacity Allocated to Each Space  
\* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum \*



What is happening during the start of each hour appears here.





Continuous Load Factor  
125%

### A Day in the Life of Five EV Charging Spaces Controlled by ALMS

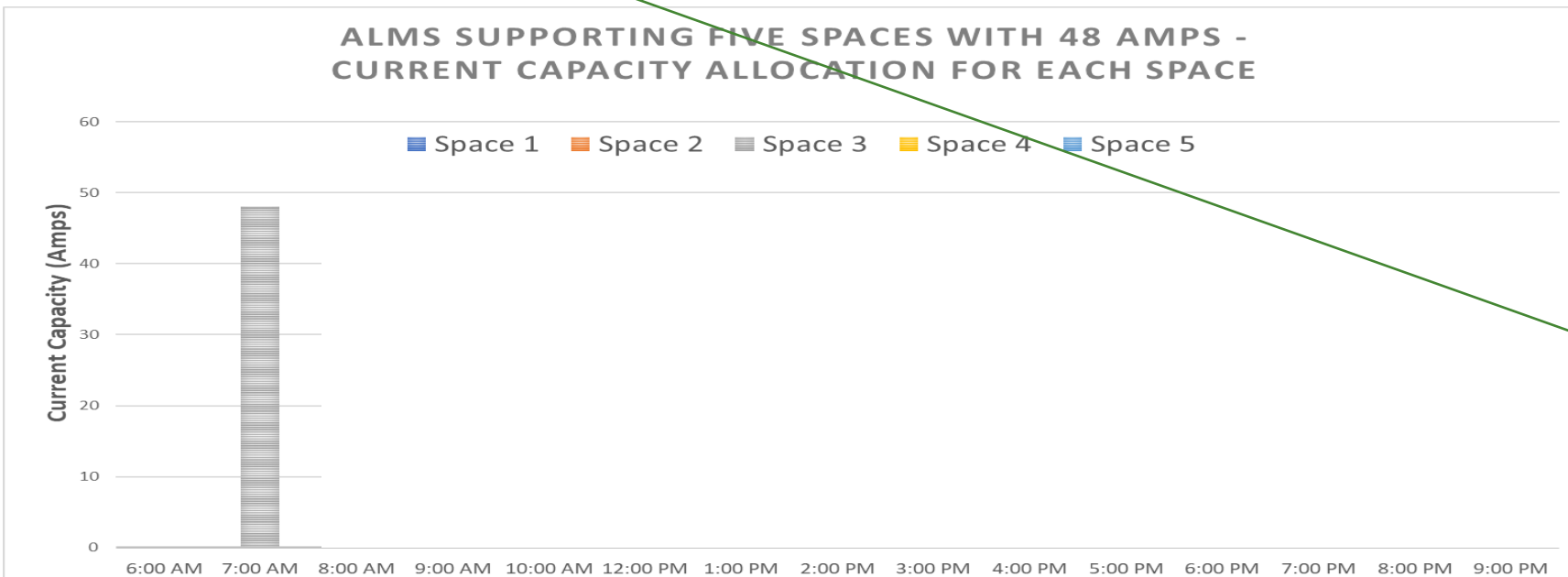
(Charging sessions shortened for impact)

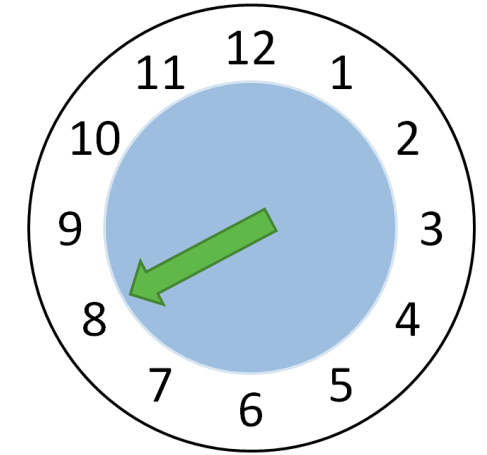
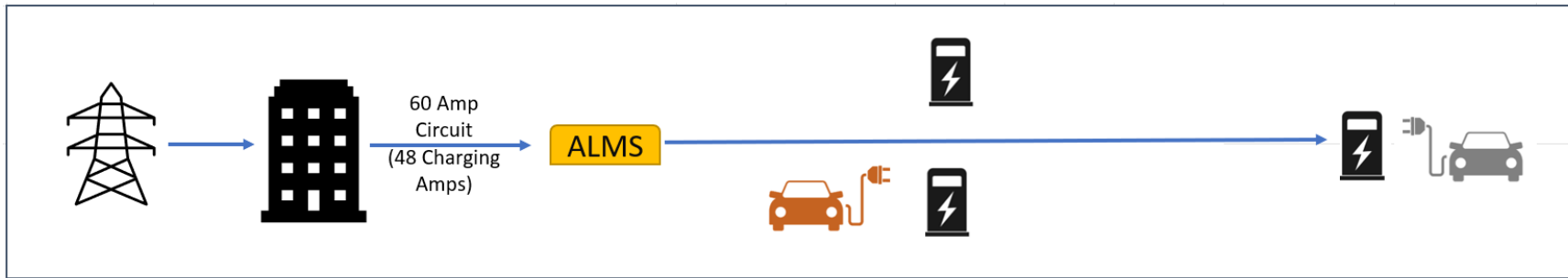
Current Capacity Allocated to Each Space  
\* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum \*

Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Total Available Panel Capacity (A)	Required Circuit Capacity
							Allocated Current Capacity	Unallocated Capacity
07:00 AM	Julie arrives in Space 3 and ALMS offers full current capacity	Empty	Empty	48	Empty	Empty	48	0

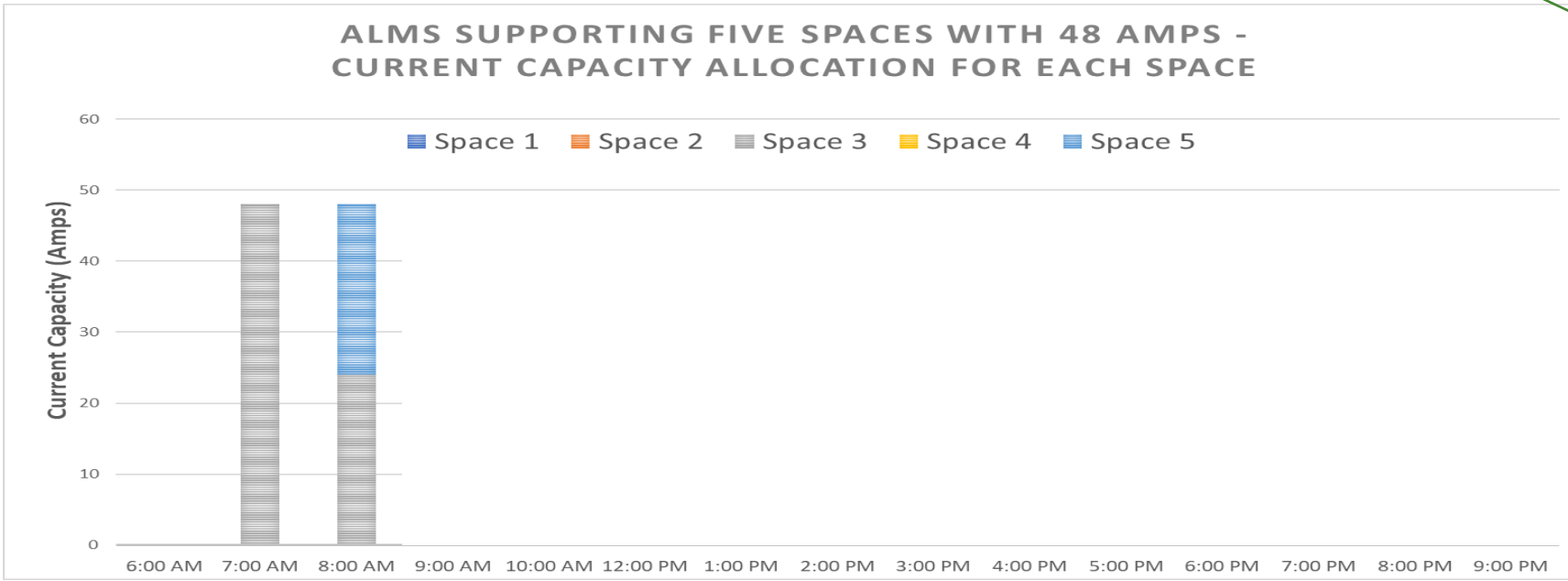
The charging current allocated to each space appear in this row

The first car arrives for the day

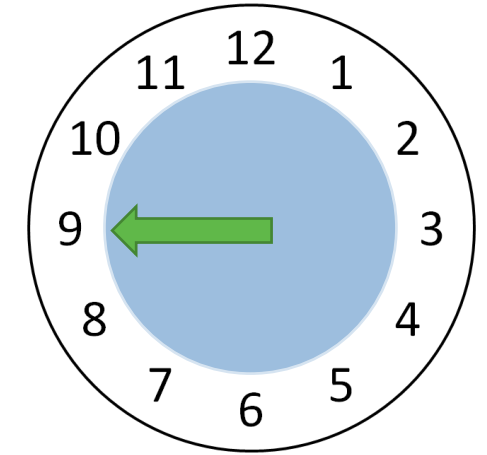
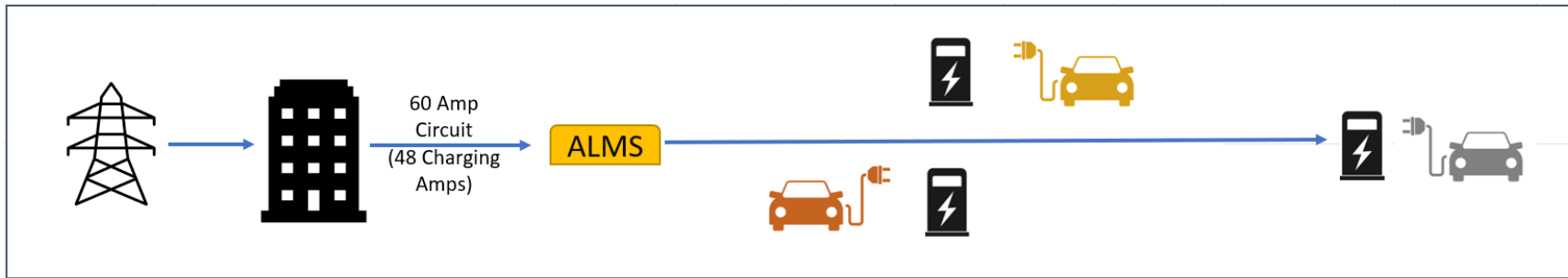




A Day in the Life of Five EV Charging Spaces Controlled by ALMS		Current Capacity Allocated to Each Space					Continuous Load Factor 125%	
(Charging sessions shortened for impact)		* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
08:00 AM	Fred arrives in Space 5, ALMS splits the current capacity equally	Empty	Empty	24	Empty	24	48	0

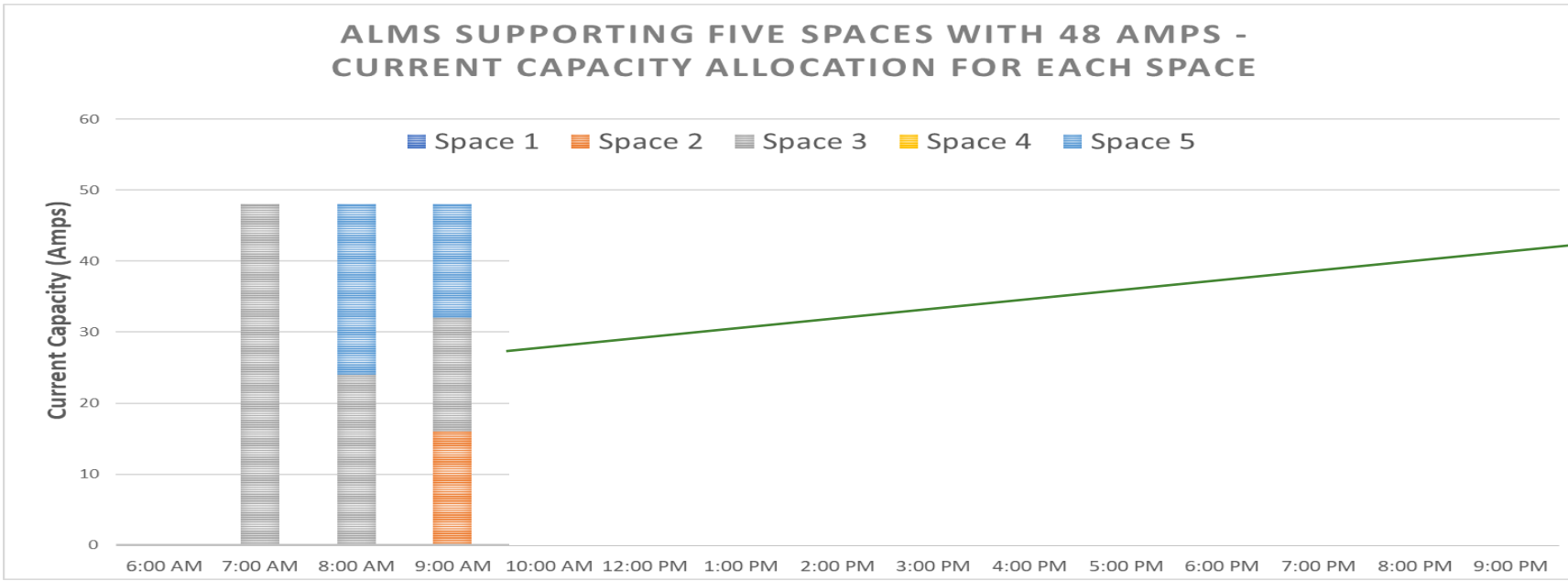


Since the shared circuit can only provide 48 Amps, ALMS instructs each EVSE to advertise a maximum current based on the rules, never exceeding 48 Amps combined.

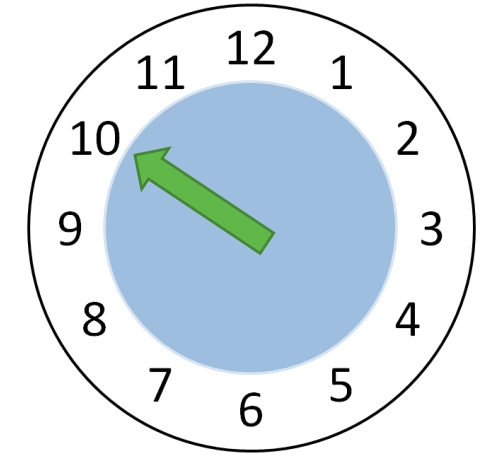
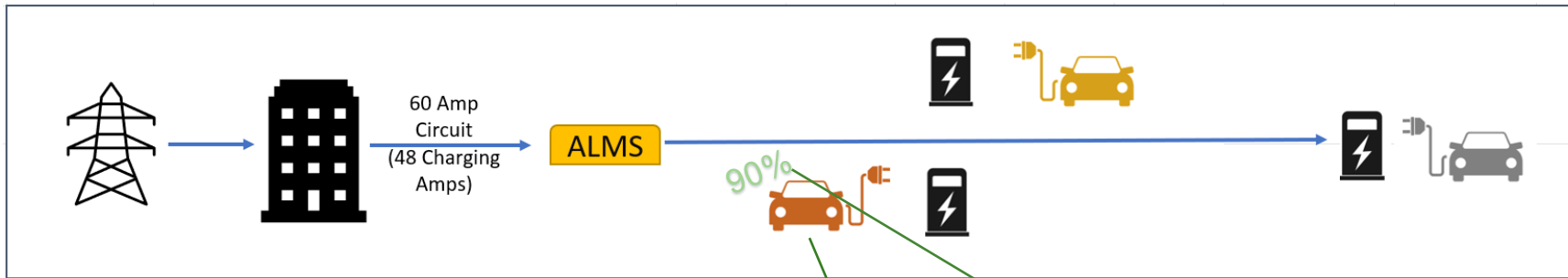


		Current Capacity Allocated to Each Space					Continuous Load Factor	
		* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
							48	60
							Allocated Current Capacity	Unallocated Capacity
09:00 AM	Jose arrives in Space 2, ALMS splits the current capacity equally	Empty	16	16	Empty	16	48	0

(Charging sessions shortened for impact)



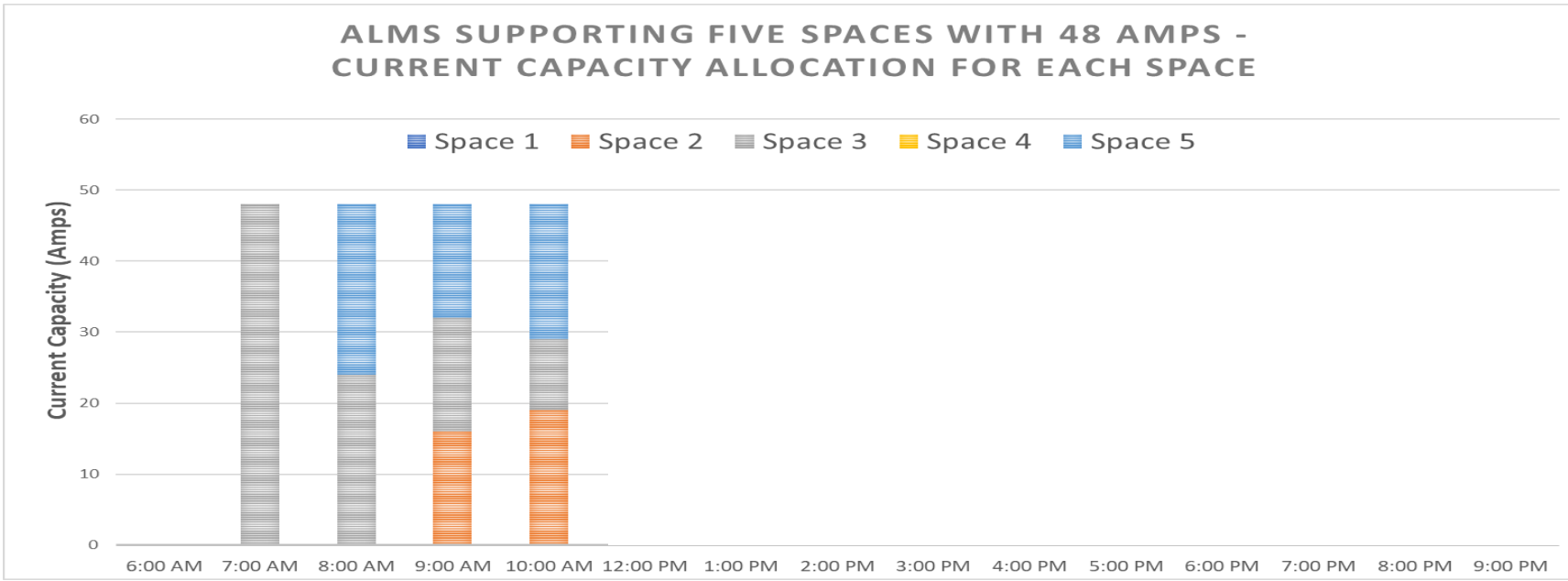
How the current is split over the day appears in this bar graph. Each space contributes to the total current.

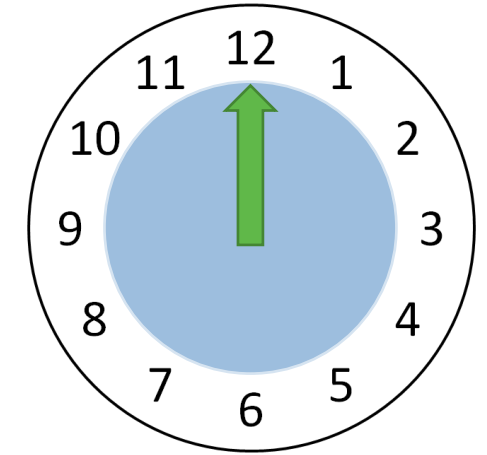
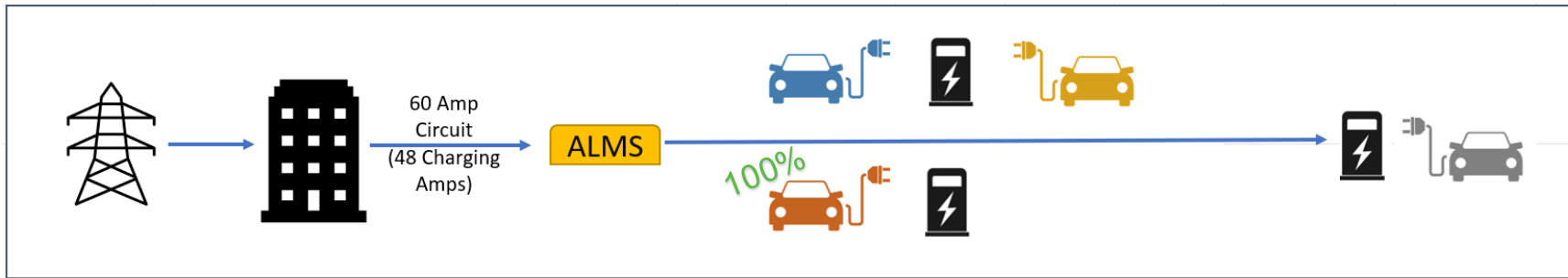


A Day in the Life of Five EV Charging Spaces Controlled by ALMS						Continuous Load Factor 125%		
(Charging sessions shortened for impact)						Total Available Panel Capacity (A)	Required Circuit Capacity	
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
10:00 AM	Julie's car getting full in Space 3 and needs less current. ALMS "frees up" some current capacity and splits between the remaining two spaces.	Empty	19	10	Empty	19	48	0

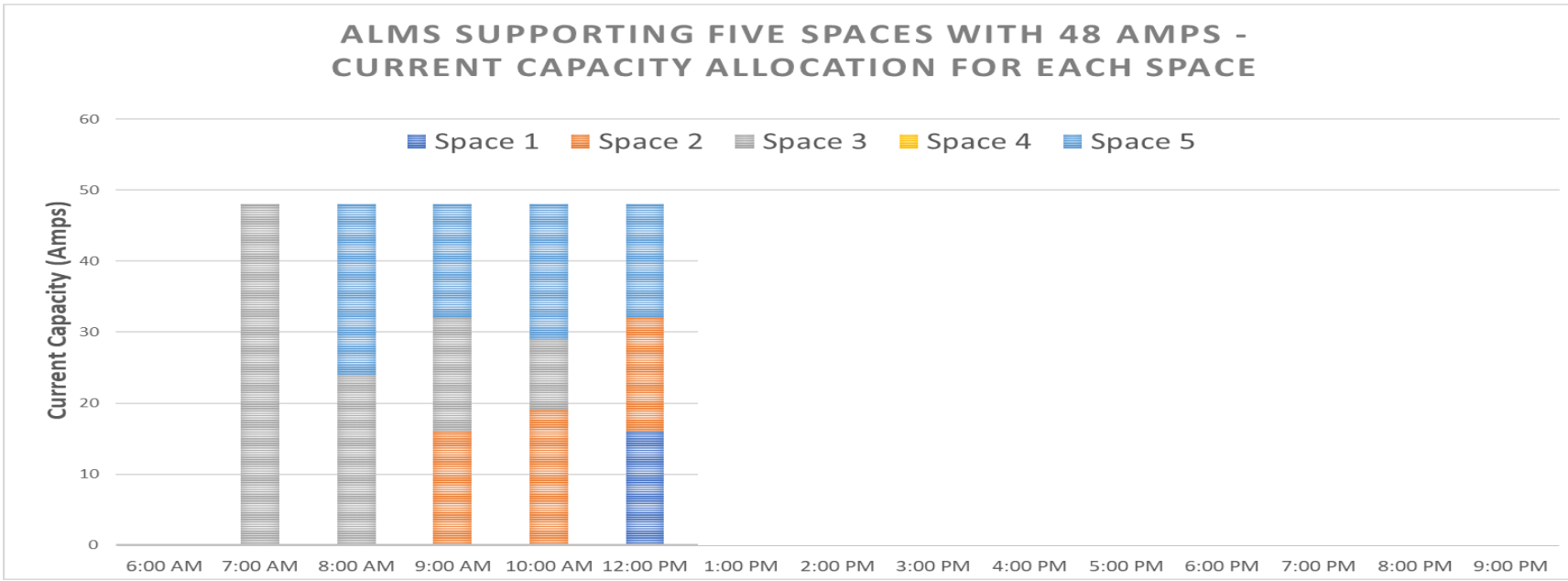
Current Capacity Allocated to Each Space  
 \* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum \*

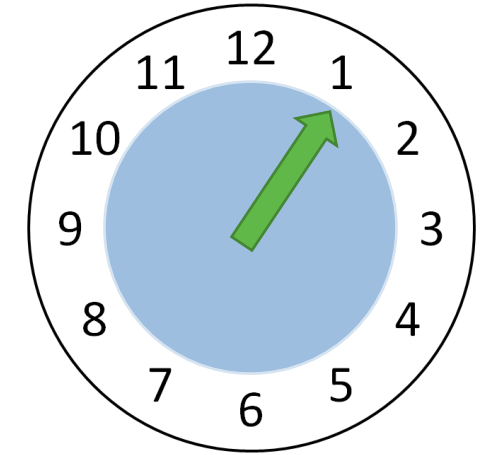
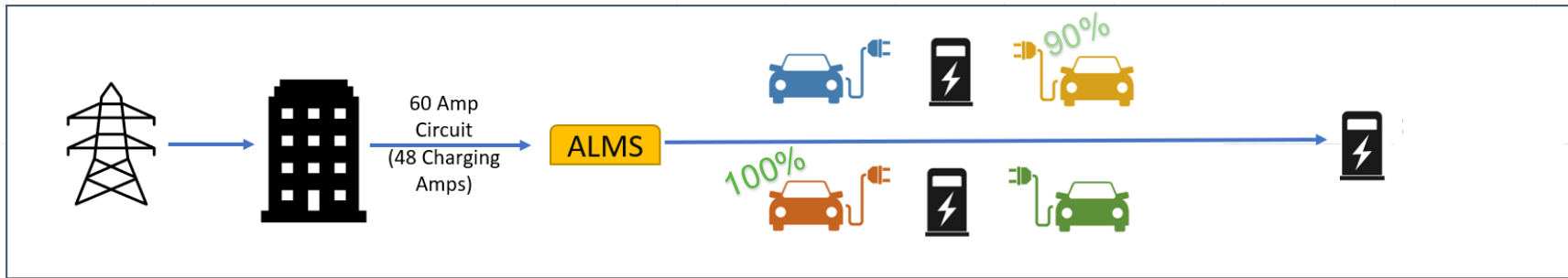
EVSEs advertise the maximum current available and the EV sets its own value below that. Once an EV gets close to full, it may reduce the charging current. The ALMS can then reallocate some current to other sessions.



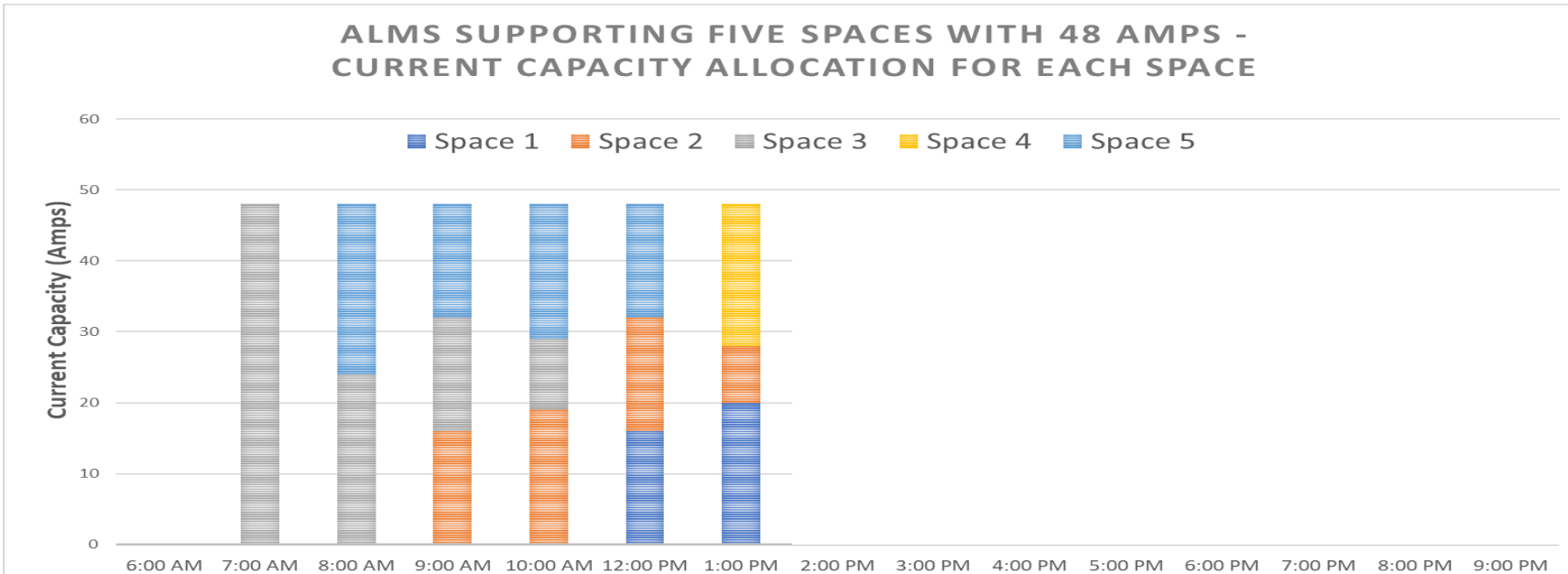


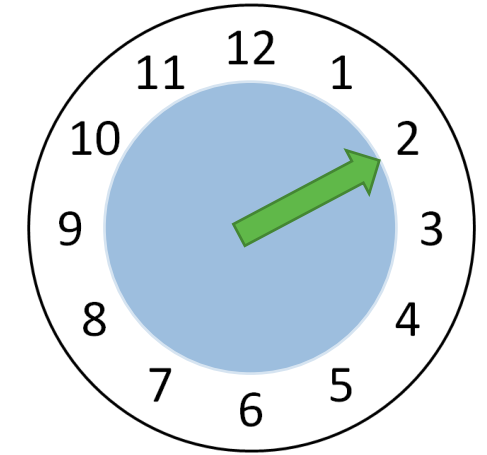
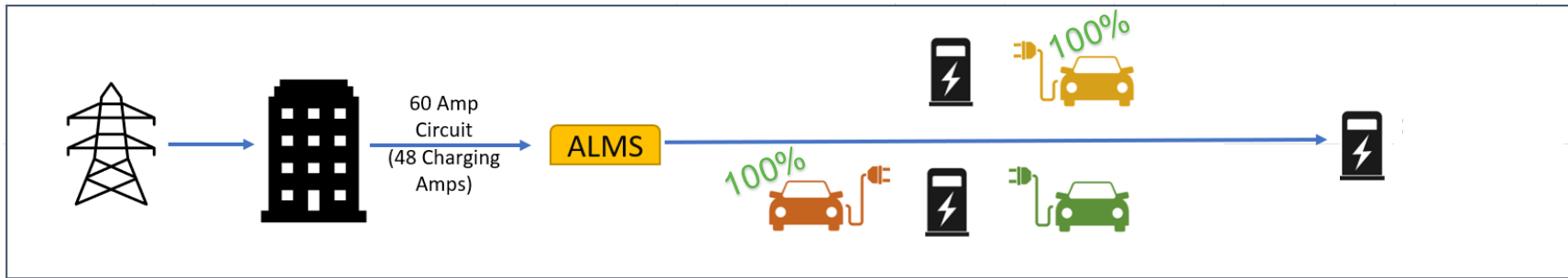
							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
12:00 PM	Tom parks in Space 1, Julie's car full in Space 3, ALMS splits current capacity equally	16	16	Full ☺	Empty	16	48	0



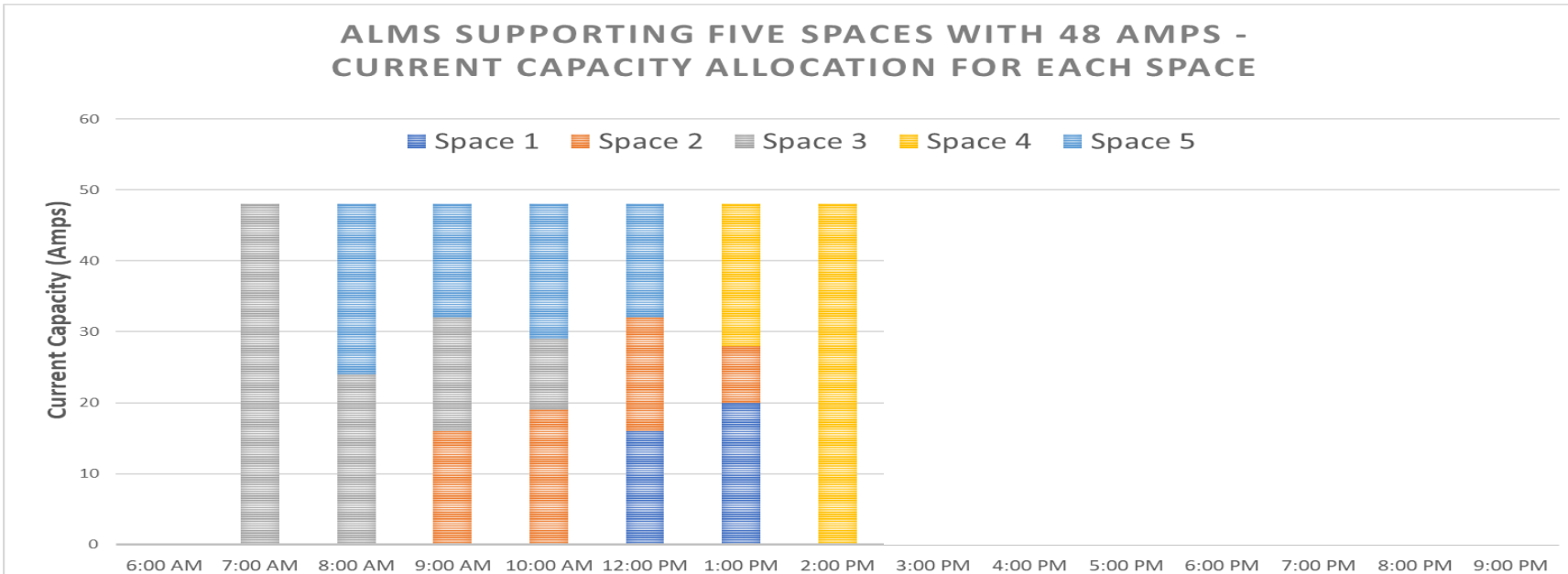


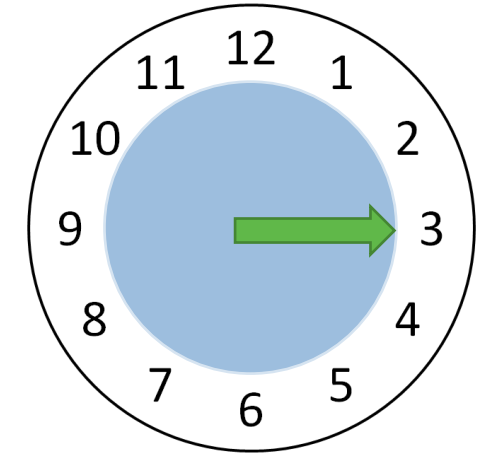
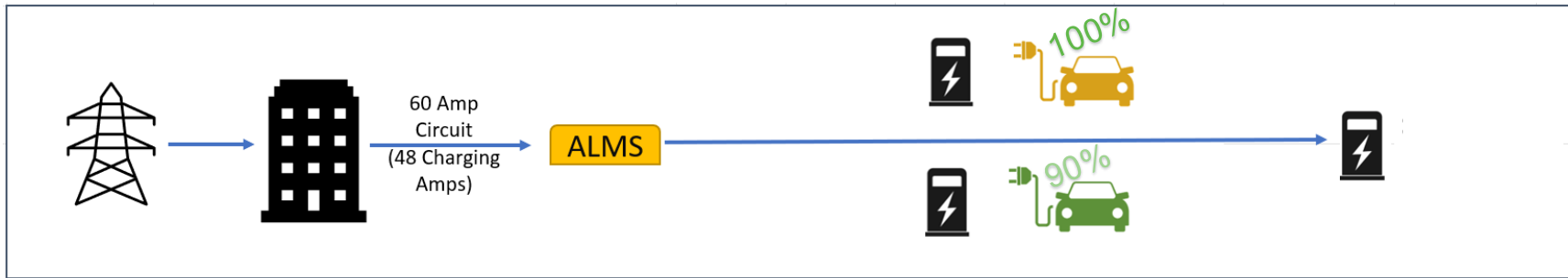
							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
01:00 PM	Sally parks in Space 4, Fred leaves Space 5, Jose car getting full in Space 2	20	8	Full ☺	20	Empty	48	0





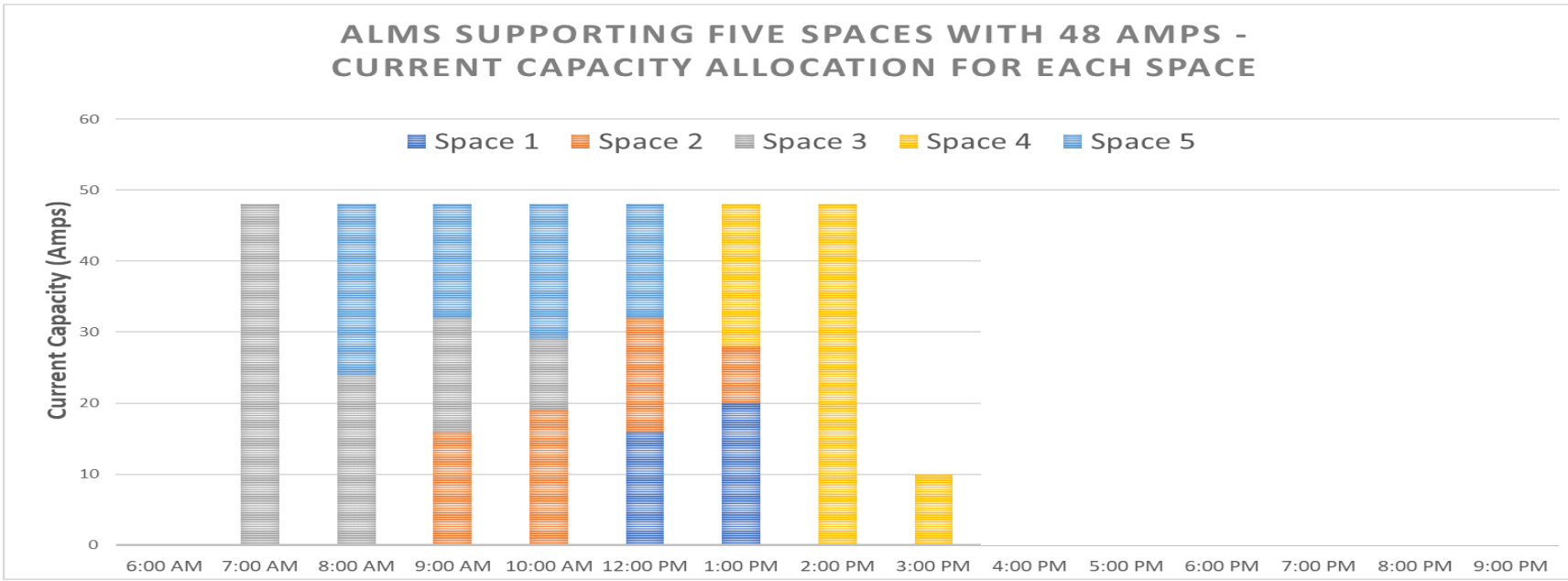
							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
02:00 PM	Jose's car in Space 2 now full, Tom leaves Space 1, ALMS offers Sally full current capacity in Space 4	Empty	Full 😊	Full 😊	48	Empty	48	0

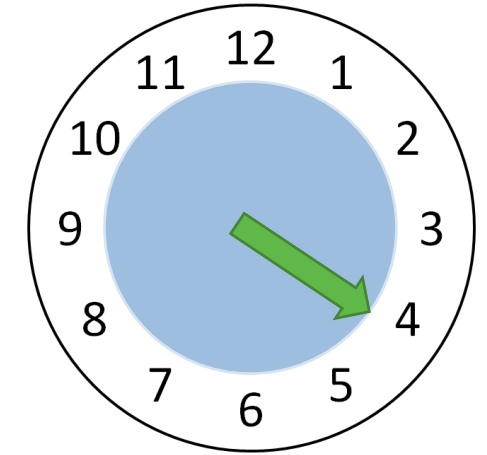
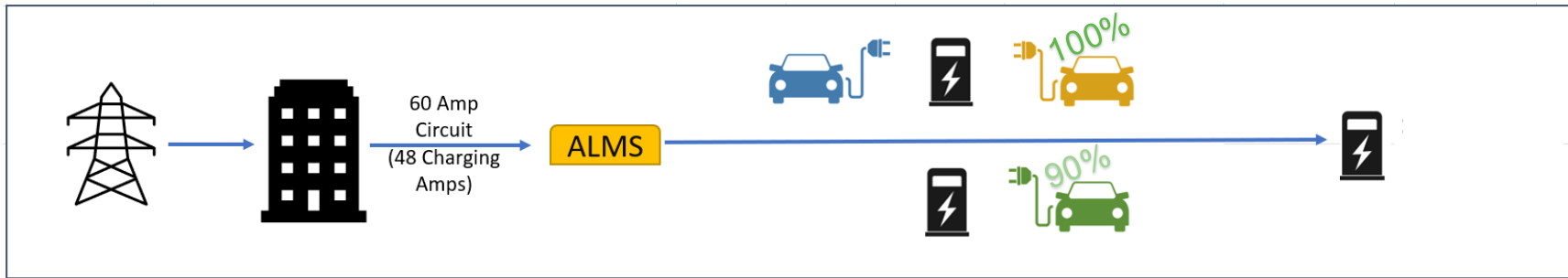




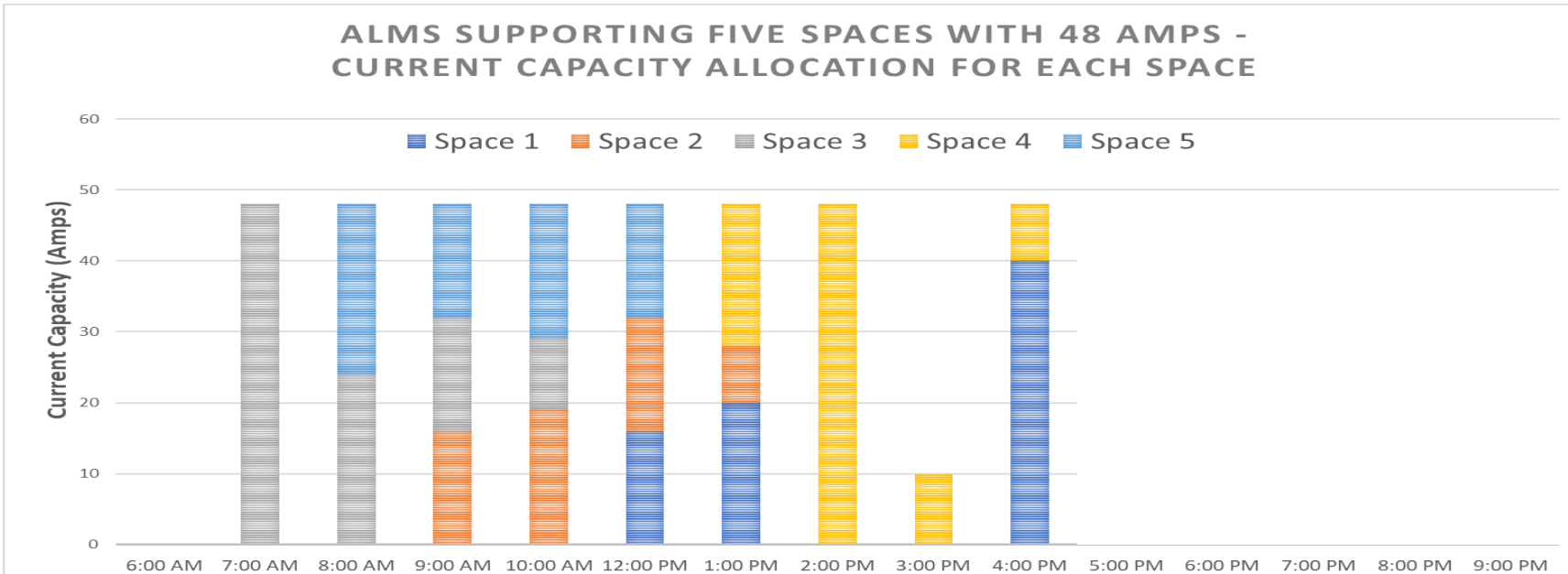
A Day in the Life of Five EV Charging Spaces Controlled by ALMS		Current Capacity Allocated to Each Space					Continuous Load Factor 125%	
(Charging sessions shortened for impact)		* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	48	60
							Allocated Current Capacity	Unallocated Capacity
03:00 PM	Julie leaves Space 3, Sally's car getting full in Space 4, ALMS "frees up" current capacity	Empty	Full 😊	Empty	10	Empty	10	38

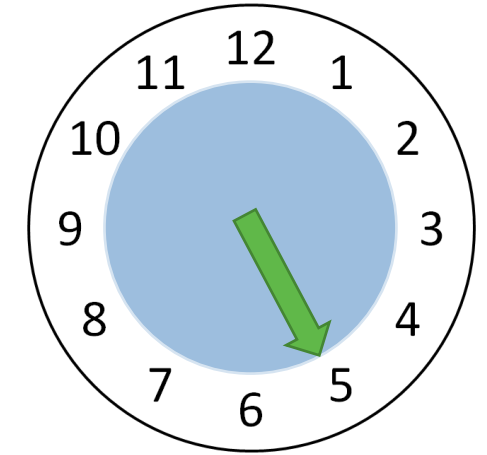
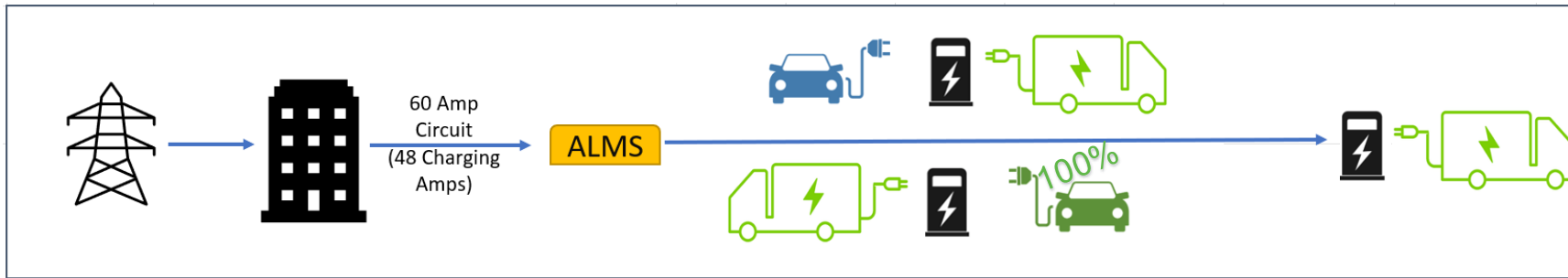
There may be times when the spaces don't need full capacity



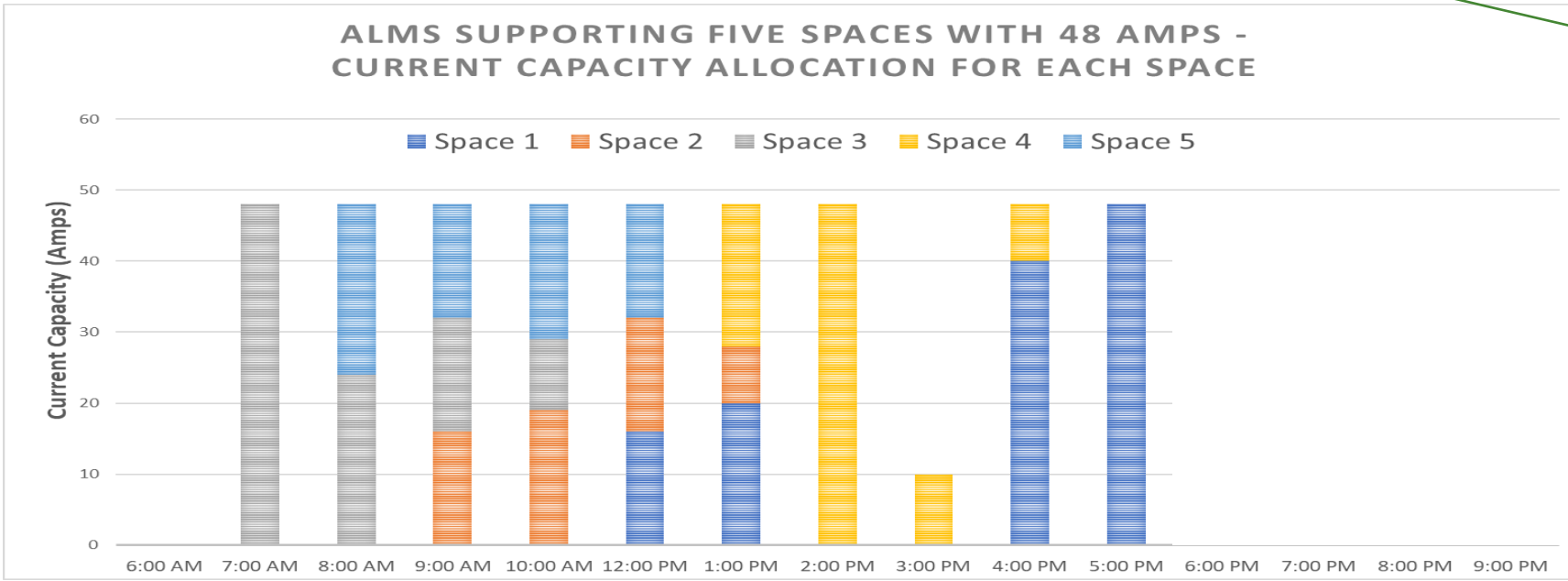


							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
04:00 PM	Sally's car nearly finished in Space 4, Lucy parks in Space 1, and ALMS offers Lucy remaining current capacity	40	Full 😊	Empty	8	Empty	48	0

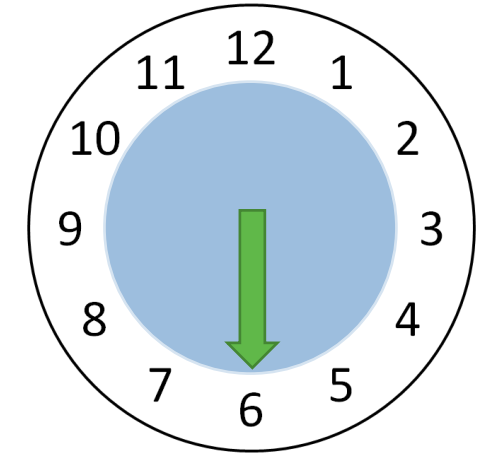
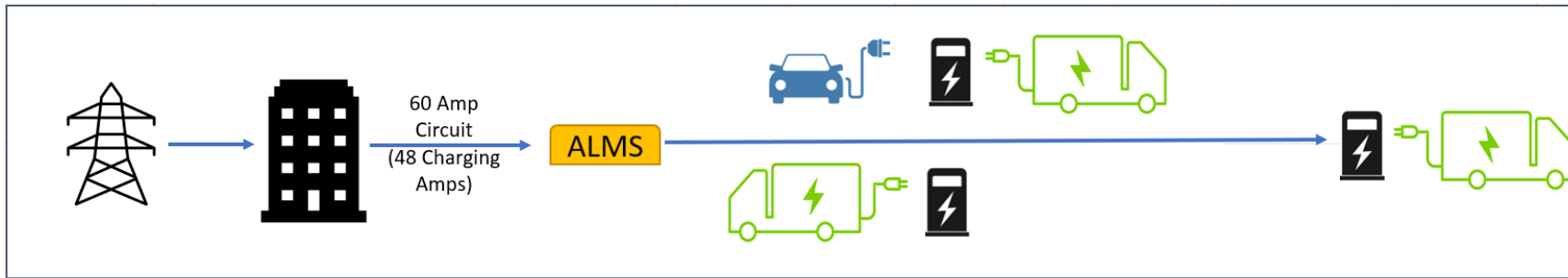




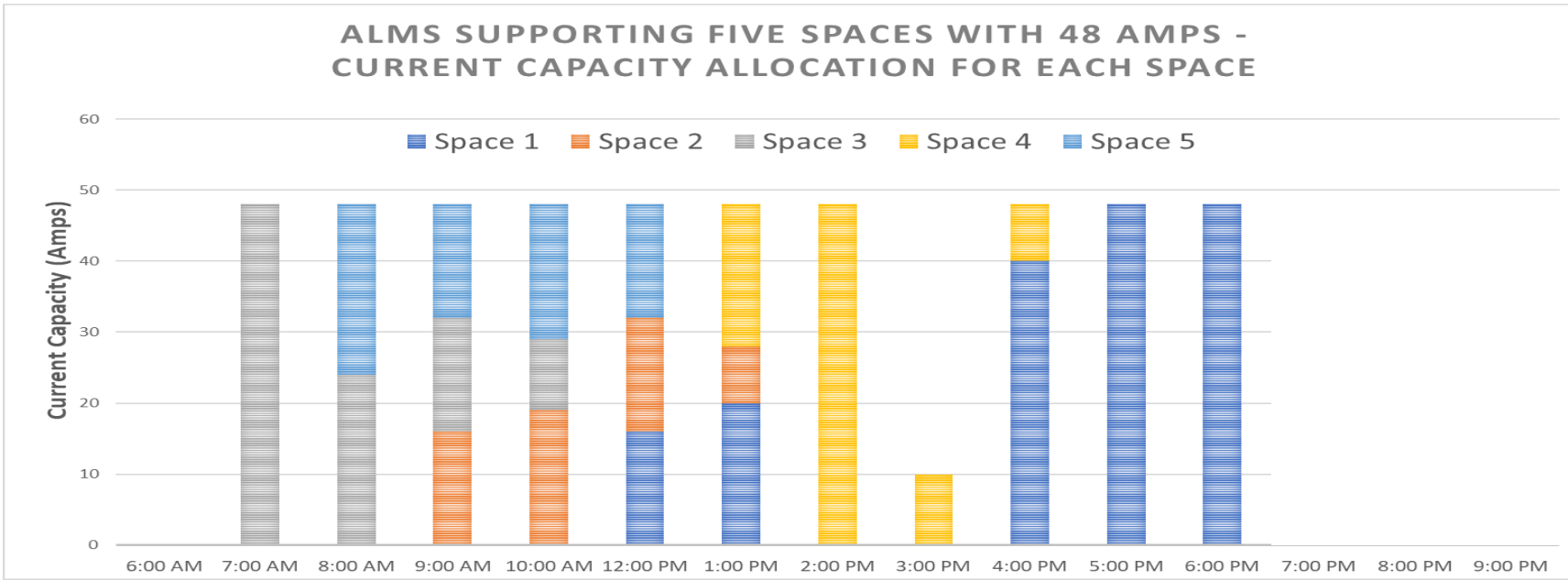
A Day in the Life of Five EV Charging Spaces Controlled by ALMS		Current Capacity Allocated to Each Space					Continuous Load Factor 125%	
(Charging sessions shortened for impact)		* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
05:00 PM	Sally finished charging in Space 4. Fleet returns filling Space 2,3,5. ALMS delays charging until Lucy's prioritized session is complete or 8pm whichever comes first.	48	Delayed per ALMS rule	Delayed per ALMS rules	Full 😊	Delayed per ALMS rule	48	0

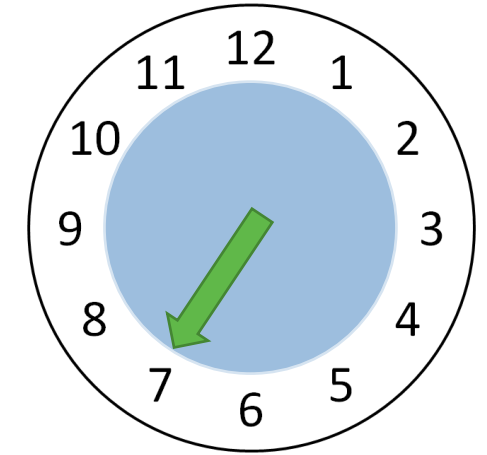
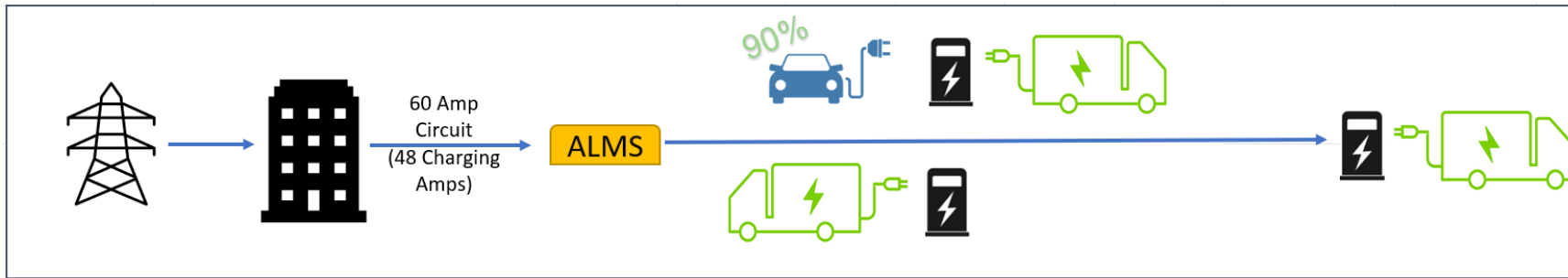


ALMS can control charging rates for business rules as well as infrastructure protection. In this case, the visitor car is prioritized over the fleet.

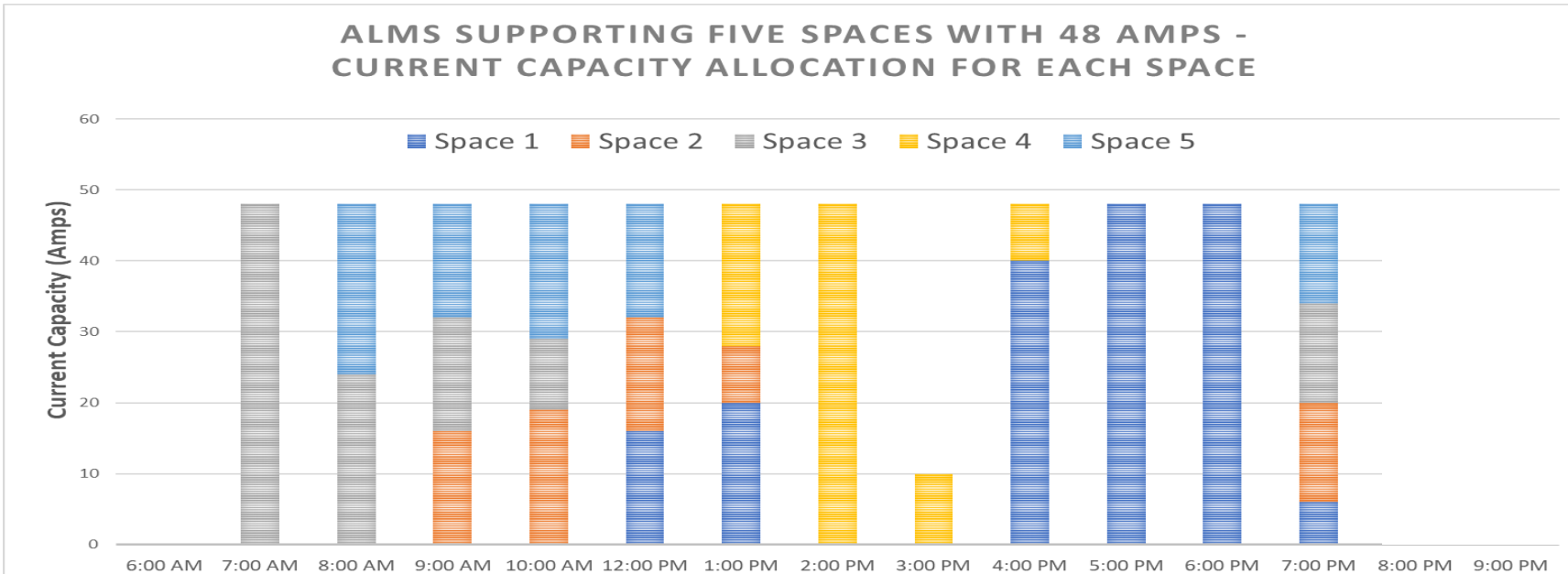


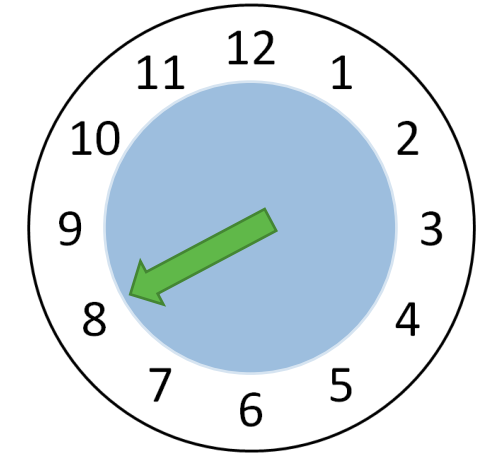
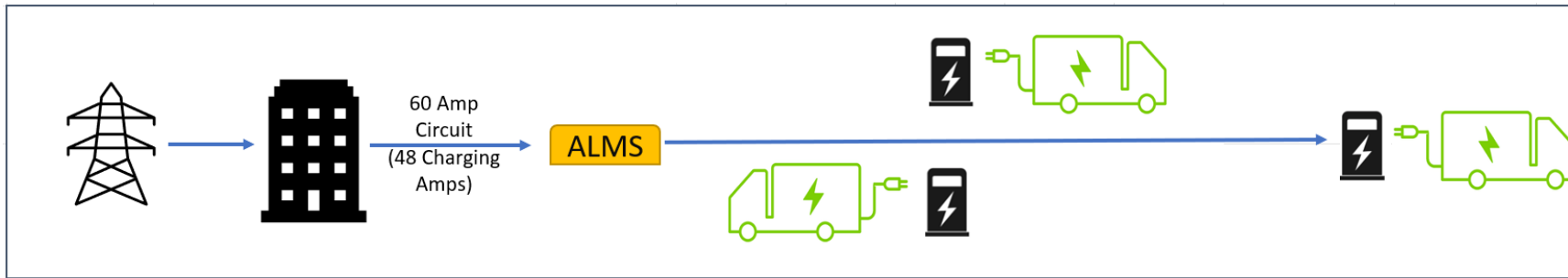
		Current Capacity Allocated to Each Space					Continuous Load Factor 125%	
		* EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
06:00 PM	Sally leaves Space 4, Lucy still allocated full capacity for Space 1 per ALMS rule	48	Delayed per ALMS rule	Delayed per ALMS rules	Empty	Delayed per ALMS rule	48	0



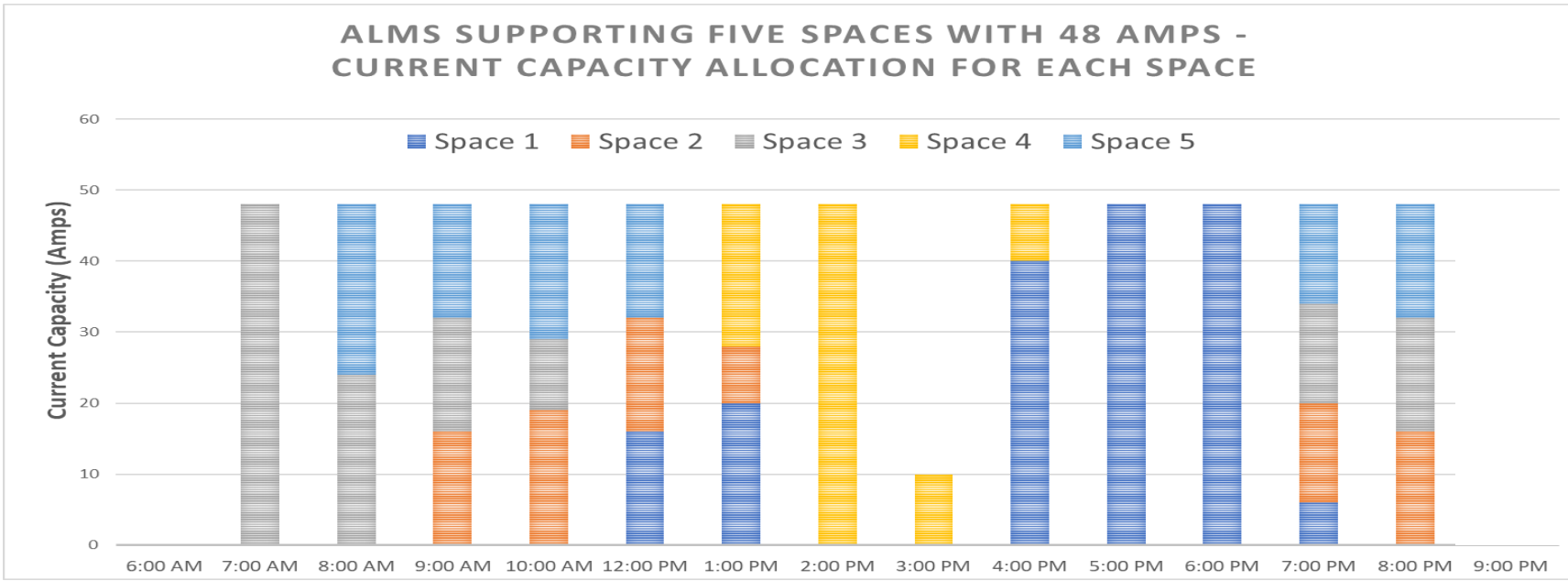


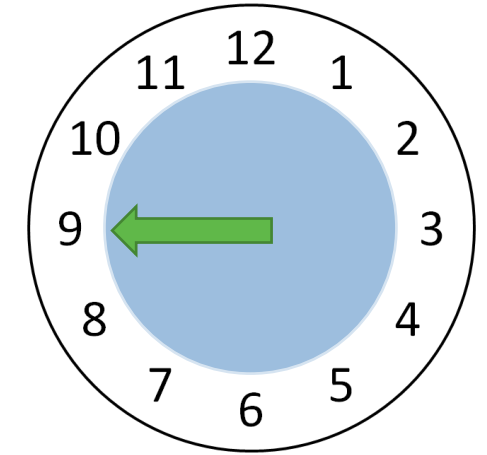
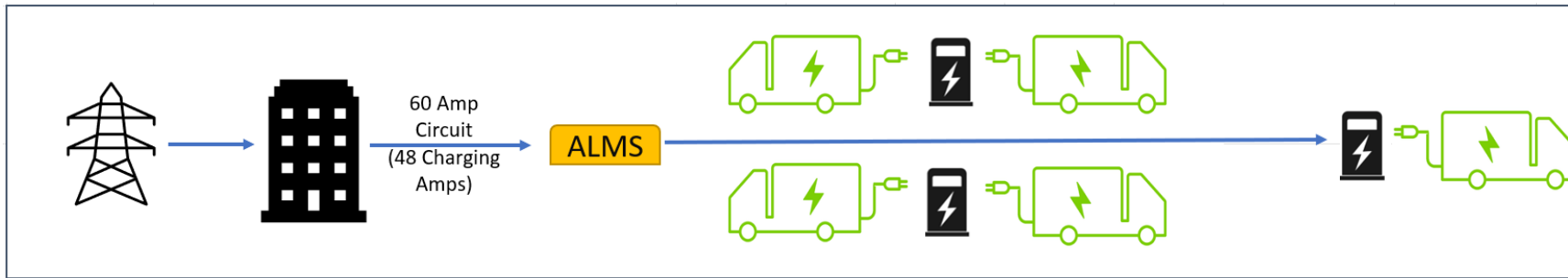
							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
07:00 PM	Lucy's car getting full and needs less capacity for Space 1. Rules allocate balance to fleet or until 8pm whichever comes first	6	14	14	Empty	14	48	0



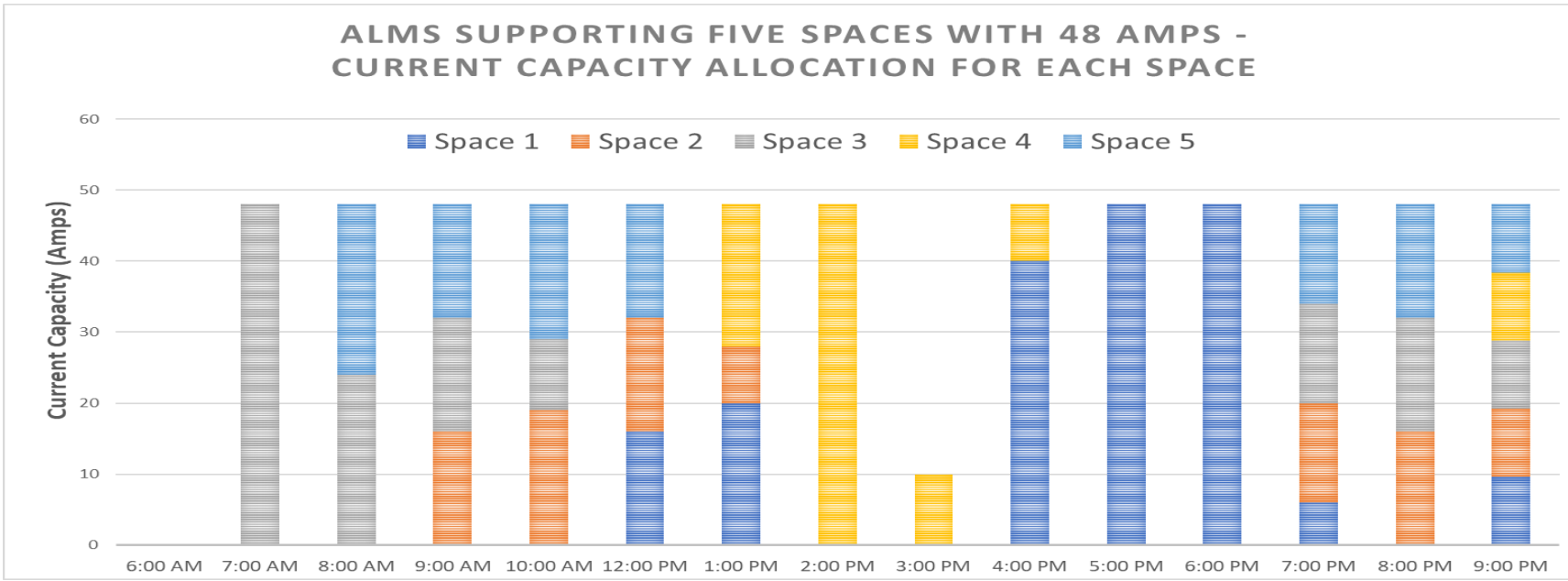


							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
08:00 PM	Lucy leaves Space 1. ALMS splits current capacity evenly after 8pm based on rules.	Empty	16	16	Empty	16	48	0





							Continuous Load Factor 125%	
<b>A Day in the Life of Five EV Charging Spaces Controlled by ALMS</b>		Current Capacity Allocated to Each Space * EVSE advertises max current capacity to vehicle, vehicle takes the current it needs below that maximum *					Total Available Panel Capacity (A)	Required Circuit Capacity
(Charging sessions shortened for impact)							48	60
Time of Day	Activity	Space 1	Space 2	Space 3	Space 4	Space 5	Allocated Current Capacity	Unallocated Capacity
09:00 PM	Fleet fills Spaces 1 and 4. ALMS continues "long dwell" charging overnight for all Spaces.	9.6	9.6	9.6	9.6	9.6	48	0



# References

Live parking lot with 50 spaces controlled by ALMS

- <https://jpl.powerflex.com/d/000000001/arroyo-parking-garage?viewPanel=820&orgId=1&refresh=1m&from=now-7d&to=now>

EV Energy Management Systems white paper (CSA Group)

- [https://www.csagroup.org/wp-content/uploads/CSA-RR\\_ElectricVehicle\\_WebRes.pdf](https://www.csagroup.org/wp-content/uploads/CSA-RR_ElectricVehicle_WebRes.pdf)

Electric Vehicle Vectors by Vecteezy

- <https://www.vecteezy.com/free-vector/electric-vehicle>
- <https://www.vecteezy.com/free-vector/car>
- <https://www.vecteezy.com/vector-art/3373807-electric-vehicle-charging-station-flat-style>
- <https://www.vecteezy.com/vector-art/7629947-electric-truck-outline-vector-icon-isolated-on-white-background>

# Executive Order N-79-20



San Francisco Chronicle

California to ban sale of new gas-only cars in 2035 under Newsom order

## EXECUTIVE ORDER N-79-20

### IT IS HEREBY ORDERED THAT:

1. It shall be a goal of the State that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035. It shall be a further goal of the State that 100 percent of medium- and heavy-duty vehicles in the State be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks. It shall be further a goal of the State to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.
- ...
5. The Energy Commission, in consultation with the State Air Resources Board and the Public Utilities Commission, shall update the biennial statewide assessment of zero-emission vehicle infrastructure required by Assembly Bill 2127 (Chapter 365, Statutes of 2018) to support the levels of electric vehicle adoption required by this Order.

Source: [Executive Order N-79-20](#)

# National Electrical Code (NEC) ALMS Provision

2017 National Electrical Code (NEC) 625.42<sup>1</sup>:

**625.42 Rating.** *The equipment shall have sufficient rating to supply the load served. Electric vehicle charging loads shall be considered to be continuous loads for the purposes of this article. Where an automatic load management system is used, the maximum equipment load on a service and feeder shall be the maximum load permitted by the automatic load management system.*

<sup>1</sup>First introduced into the 2014 NEC as 625.41 (adopted in 2016 California Electrical Code)

# EV Ready Level 2 Receptacle Configurations

CALGreen EV Residential - **4.106.4.2.2** has specific configurations for Level 2 (208/240V) Receptacles.

NEMA 6-20 (20A circuit, 16A charging)

NEMA 14-30 (30A circuit, 24A charging)

NEMA 14-50 (50A circuit, 40A charging)

