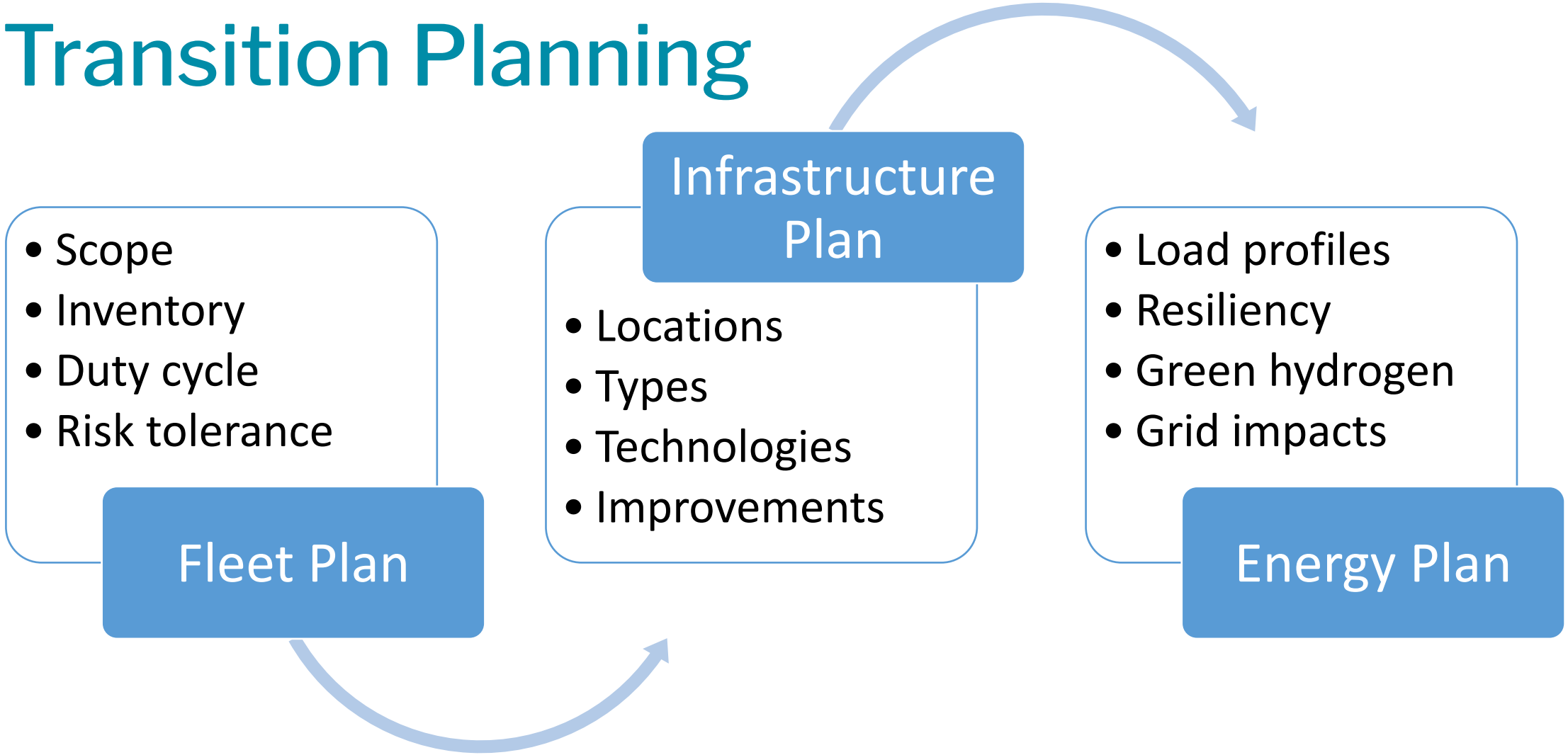
Planning for the Transition Coast-to-Coast EV

Transition Planning



Planning Checklist

Understand the Goals

- ❑ Articulate the motivations to transition the fleet
- ❑ List the benefits to City residents
- ❑ Set a timeline for implementation

Assess Fleet Vehicles

- ❑ Identify vehicles' duty cycles and operating requirements
- ❑ Associate each vehicle with a "home base" facility
- ❑ Look for opportunities to "right size" vehicles
- ❑ Identify suitable EV replacements

Assess Charging Station Needs

- ❑ Determine the charging strategy
- ❑ Identify the ideal ratio of chargers to EVs
- ❑ Estimate energy needed to charge EVs
- ❑ Evaluate each facility's electrical capacity
- ❑ Engage with the utility

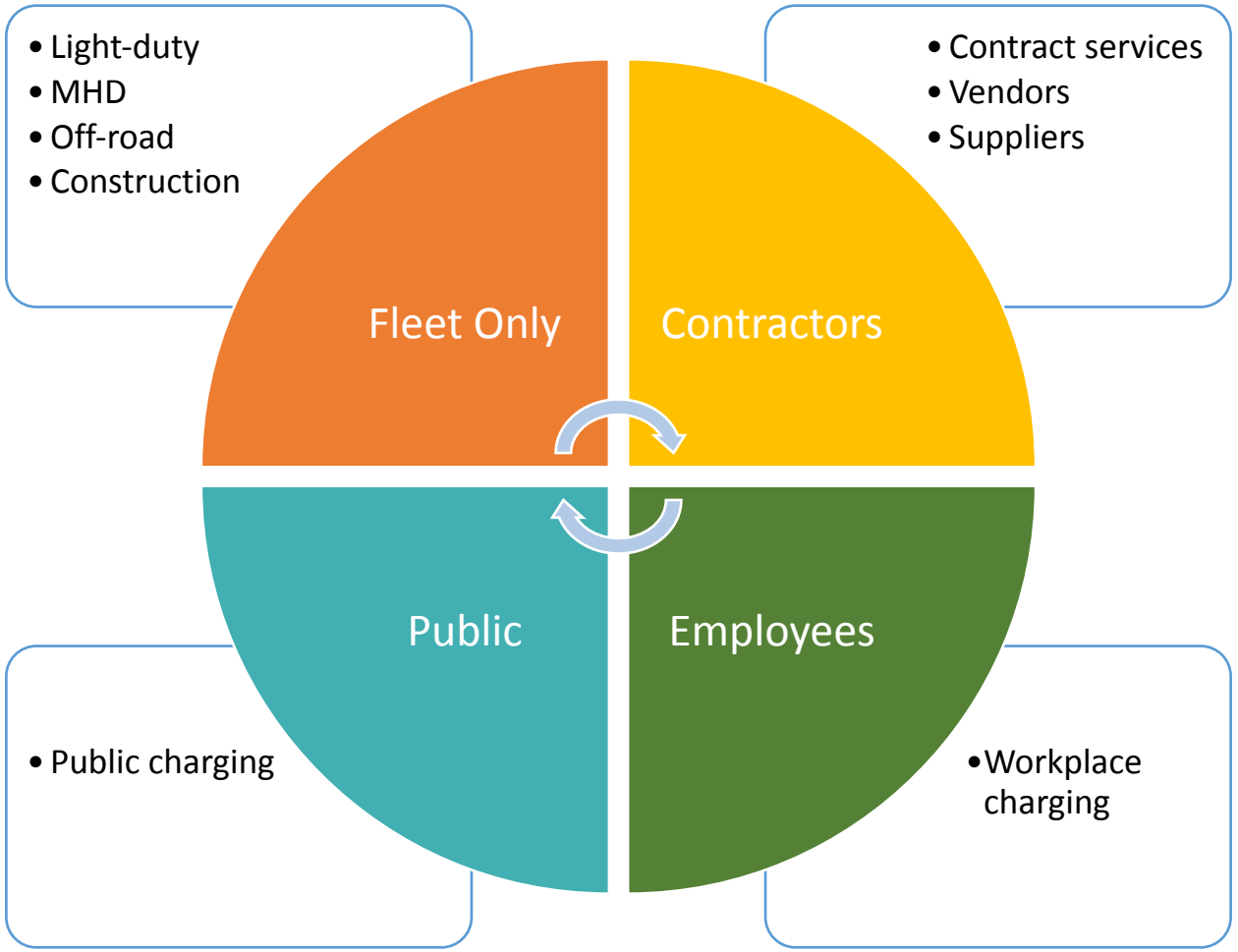
Common influencers

- Regulations
- Funding is available
- Climate Action Plans and Sustainability Plans
- Electrification efforts
- Right-sizing fleets
- Facility changes
- CEQA compliance
- Contracts ending or renewing
- Regulations

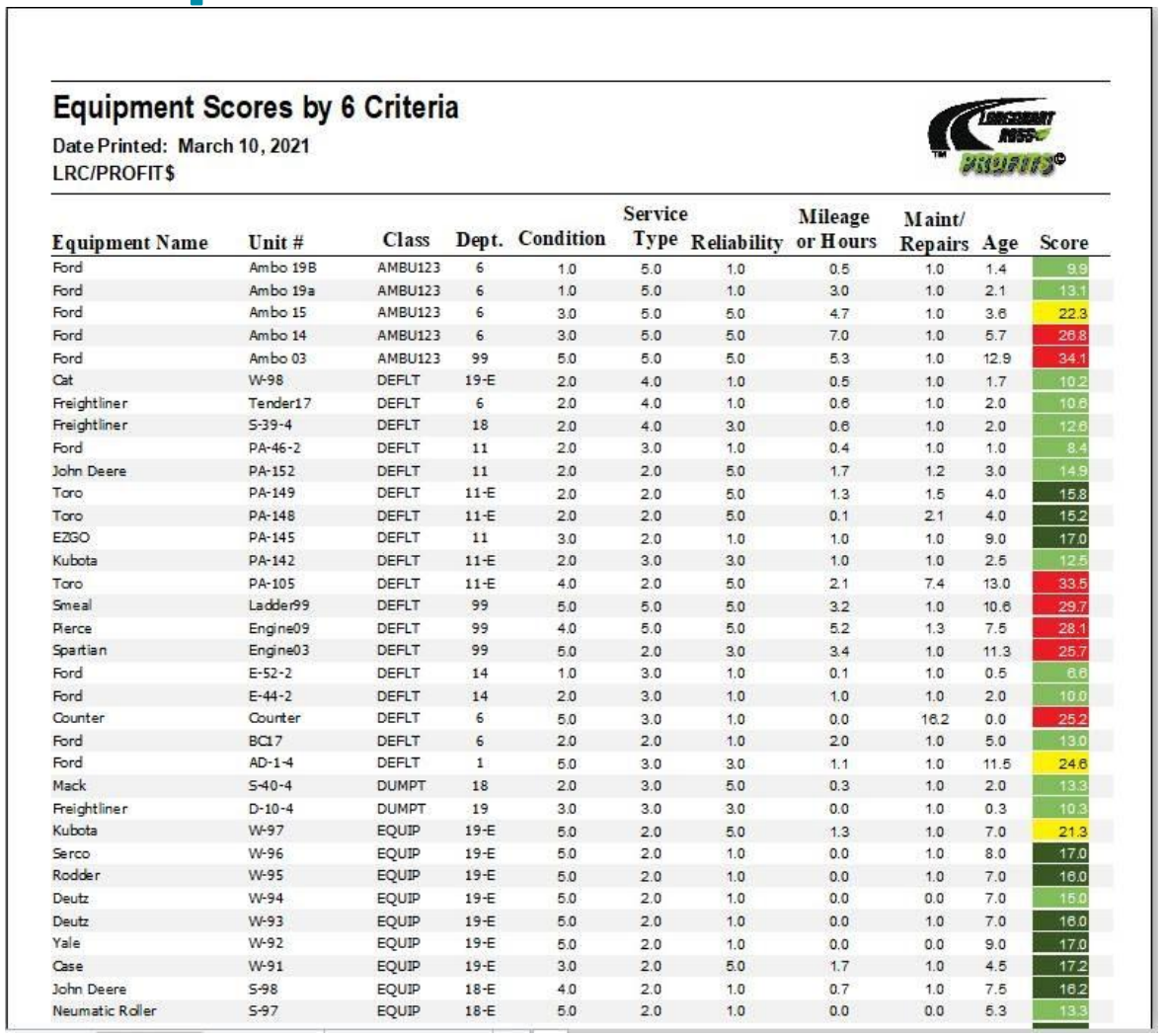
Identify all your motivators. Do the timelines agree or conflict with each other?

Vehicles and timelines

Phased approach or all at once?



Replacement



Equipment Scores by 6 Criteria

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LRC/PROFIT$

Equipment Name	Unit #	Class	Dept.	Condition	Service Type	Reliability	Mileage or Hours	Maint/ Repairs	Age	Score
Ford	Ambo 19B	AMBU123	6	1.0	5.0	1.0	0.5	1.0	1.4	9.9
Ford	Ambo 19a	AMBU123	6	1.0	5.0	1.0	3.0	1.0	2.1	13.1
Ford	Ambo 15	AMBU123	6	3.0	5.0	5.0	4.7	1.0	3.6	22.3
Ford	Ambo 14	AMBU123	6	3.0	5.0	5.0	7.0	1.0	5.7	26.8
Ford	Ambo 03	AMBU123	99	5.0	5.0	5.0	5.3	1.0	12.9	34.1
Cat	W-98	DEFLT	19-E	2.0	4.0	1.0	0.5	1.0	1.7	10.2
Freightliner	Tender17	DEFLT	6	2.0	4.0	1.0	0.6	1.0	2.0	10.6
Freightliner	S-39-4	DEFLT	18	2.0	4.0	3.0	0.6	1.0	2.0	12.6
Ford	PA-46-2	DEFLT	11	2.0	3.0	1.0	0.4	1.0	1.0	8.4
John Deere	PA-152	DEFLT	11	2.0	2.0	5.0	1.7	1.2	3.0	14.9
Toro	PA-149	DEFLT	11-E	2.0	2.0	5.0	1.3	1.5	4.0	15.8
Toro	PA-148	DEFLT	11-E	2.0	2.0	5.0	0.1	2.1	4.0	15.2
EZGO	PA-145	DEFLT	11	3.0	2.0	1.0	1.0	1.0	9.0	17.0
Kubota	PA-142	DEFLT	11-E	2.0	3.0	3.0	1.0	1.0	2.5	12.5
Toro	PA-105	DEFLT	11-E	4.0	2.0	5.0	2.1	7.4	13.0	33.5
Smeal	Ladder99	DEFLT	99	5.0	5.0	5.0	3.2	1.0	10.6	29.7
Pierce	Engine09	DEFLT	99	4.0	5.0	5.0	5.2	1.3	7.5	28.1
Spartian	Engine03	DEFLT	99	5.0	2.0	3.0	3.4	1.0	11.3	25.7
Ford	E-52-2	DEFLT	14	1.0	3.0	1.0	0.1	1.0	0.5	6.6
Ford	E-44-2	DEFLT	14	2.0	3.0	1.0	1.0	1.0	2.0	10.0
Counter	Counter	DEFLT	6	5.0	3.0	1.0	0.0	16.2	0.0	25.2
Ford	BC17	DEFLT	6	2.0	2.0	1.0	2.0	1.0	5.0	13.0
Ford	AD-1-4	DEFLT	1	5.0	3.0	3.0	1.1	1.0	11.5	24.6
Mack	S-40-4	DUMPT	18	2.0	3.0	5.0	0.3	1.0	2.0	13.3
Freightliner	D-10-4	DUMPT	19	3.0	3.0	3.0	0.0	1.0	0.3	10.3
Kubota	W-97	EQUIP	19-E	5.0	2.0	5.0	1.3	1.0	7.0	21.3
Serco	W-96	EQUIP	19-E	5.0	2.0	1.0	0.0	1.0	8.0	17.0
Rodder	W-95	EQUIP	19-E	5.0	2.0	1.0	0.0	1.0	7.0	16.0
Deutz	W-94	EQUIP	19-E	5.0	2.0	1.0	0.0	0.0	7.0	15.0
Deutz	W-93	EQUIP	19-E	5.0	2.0	1.0	0.0	1.0	7.0	16.0
Yale	W-92	EQUIP	19-E	5.0	2.0	1.0	0.0	0.0	9.0	17.0
Case	W-91	EQUIP	19-E	3.0	2.0	5.0	1.7	1.0	4.5	17.2
John Deere	S-98	EQUIP	18-E	4.0	2.0	1.0	0.7	1.0	7.5	16.2
Neumatic Roller	S-97	EQUIP	18-E	5.0	2.0	1.0	0.0	0.0	5.3	13.3

- "We keep all the old vehicles in case we need them."
- "Whomever is loudest gets the new vehicle."
- "We only replace vehicles when we have the budget."
- "We replace based on O&M costs."

Is this enough time to order EVs and install charging stations?

Existing contracts

- Conventional fuels
- Vehicle maintenance
- Service and warranties
- Cooperative purchasing
- Labor
- Contracted services

If any are coming up for rebid or negotiation, what do you need to consider in your plan?

The inventory

Desired Information	Alternative #1	Alternative #2
Vehicle VIN, make, model, model year, vehicle type, fuel type	Vehicle ID/unit number (if different from VIN)	
Vehicle description (detailed)	Vehicle description (brief)	N/A
In-service and replacement year	In-service or replacement year	N/A
Original cost, expected surplus proceeds, and budgeted replacement cost	Original cost and budgeted replacement cost	Original cost or budgeted replacement cost
Address of domicile (or "take home")	N/A	
Assigned division and department	Assigned department	Specific vehicle use case
Hours parked at assigned domicile	Hours parked and domicile address	Domicile address
Typical and max duty cycle (or telematics data)	Weekly mileage data or fuel use	Current odometer
Annual O&M cost: fuel, maintenance, insurance, licensing, fuel infrastructure	Annual O&M cost: subset	Assumption data from team
Special equipment or configuration (e.g.. liftgate, license plate reader, 4WD, snowplow)	N/A	

What is a duty cycle and why do we care?

Public works has a van that drives 12 miles a day. Easy BEV r

It’s a CCTV van and the engine idles to provide power to the camera and other equipment needed for pipeline inspection. Plus, it’s in a hot environment and the air-conditioned cab provides shelter for the technician.

What is a duty cycle and why do we care?

Tesla cars and the Mustang Mach-E are fast cars with long range that would work for police patrol

PD uses “hot seat” car swapping. Patrol cars dwell for less than 10 minutes, which isn’t ideal for a charge. You may need additional charging stations or additional patrol cars.

Does the vehicle…

1. Carry or tow something heavy?
2. Idle to operate electronics or equipment?
3. Stop for 2+ hours during the shift?
4. Go home with the operator?
5. Drive more than 150 miles a day at any time? If so, how often?
6. Get used for emergency response?
7. Have a special use?

ZEVs available now or soon

ZEVs in demos and pilots

Class Two: 6,001 to 10,000 lbs.

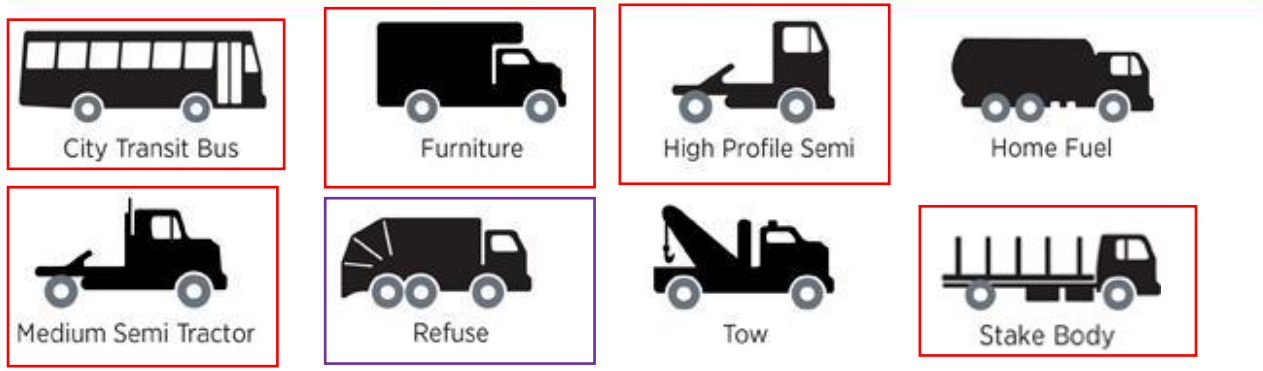
Class Three: 10,001 to 14,000 lbs.

Class Four: 14,001 to 16,000 lbs.

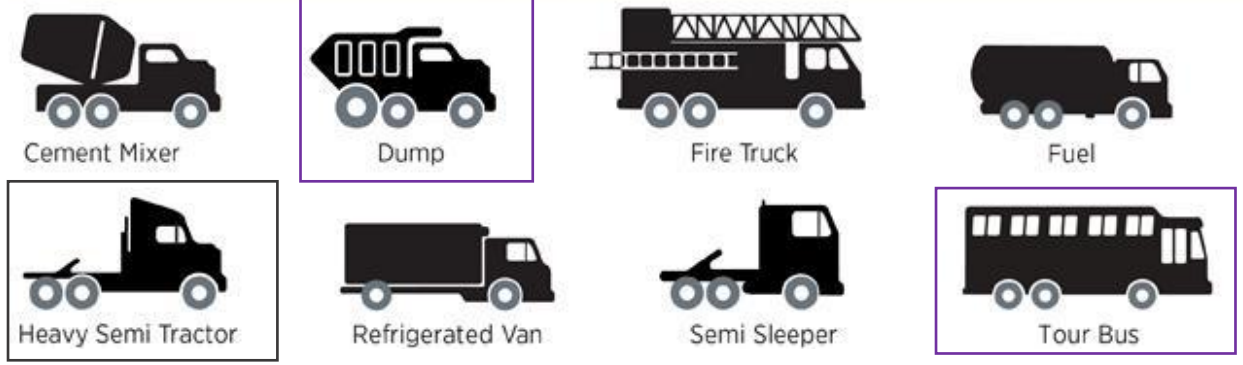
Class Five: 16,001 to 19,500 lbs.

Class Six: 19,501 to 26,000 lbs.

Class Seven: 26,001 to 33,000 lbs.



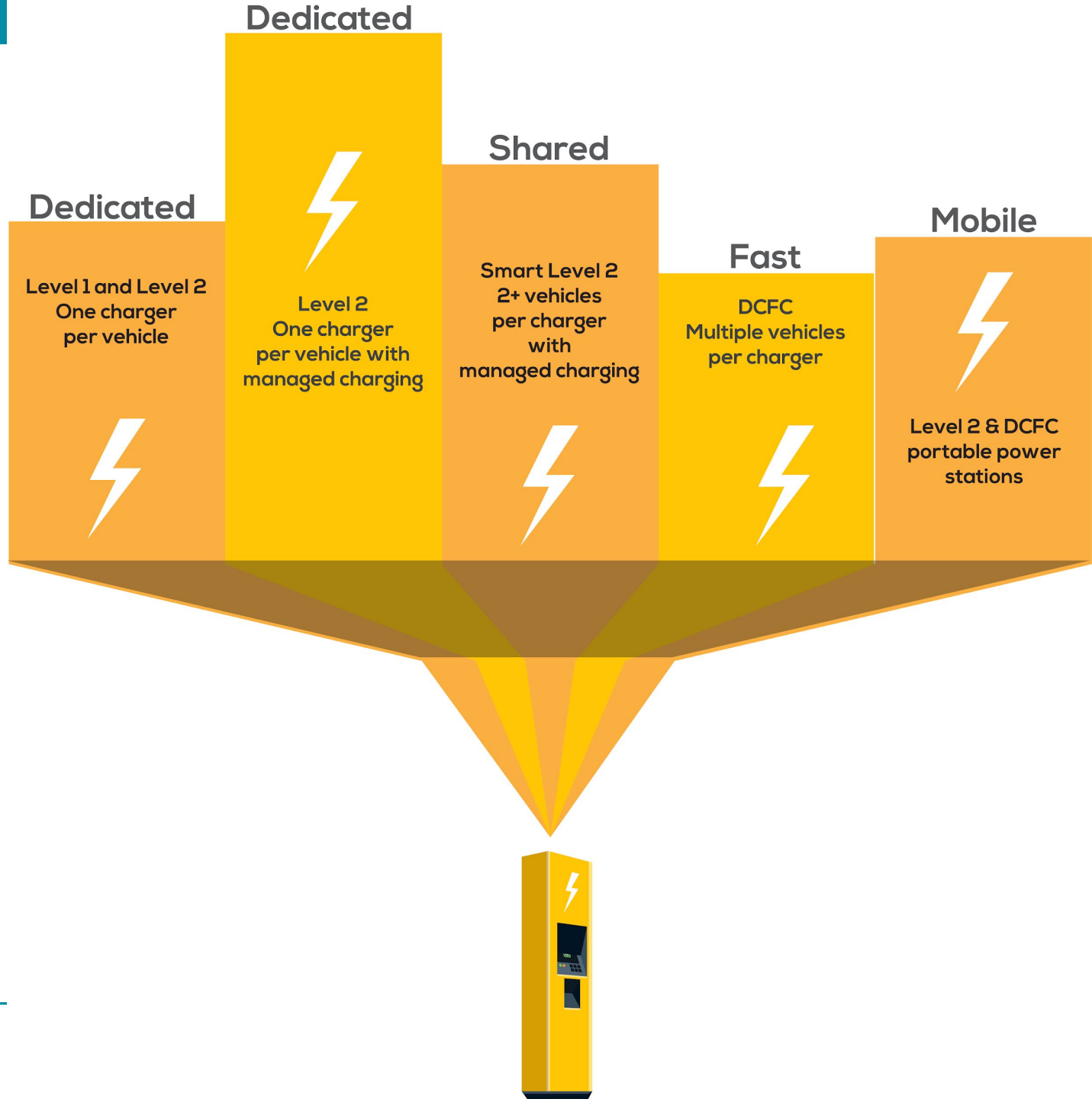
Class Eight: 33,001 lbs. & over



Charging or fueling: Find the constraints

- “Moving vehicle in the corp yard is like Tetris. I don’t know how we’ll do it with charging stations.”
- “Municipal code states that fleet fueling can’t be available to the public.”
- “Our buildings are already at maximum electrical capacity.”
- “The city leases all the property.”

Five Charging Station Models



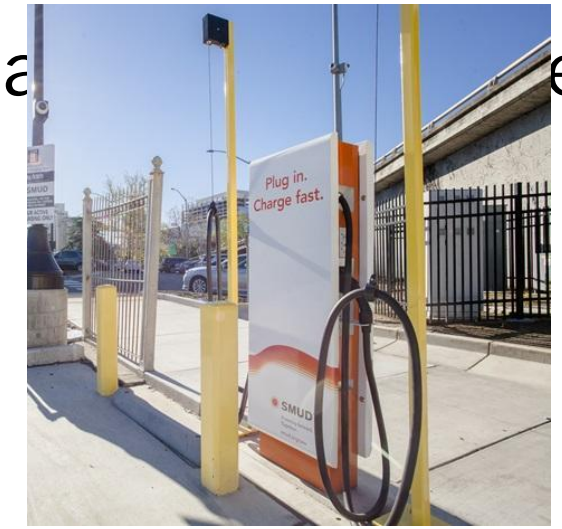
FRONTIER energy

Data for each facility

- Number of parking stalls
- Access controls (or lack of controls)
- Load data and/or electric bills
- As-built drawings
- Ownership
- Plans for upgrades that would impact electrical service
- Projected EV energy use by hour/day

Selecting the spot

- Close to the panel and electrical supply
- Comply with codes and ADA
- Lighting, weather protection, cord management, signs, access control



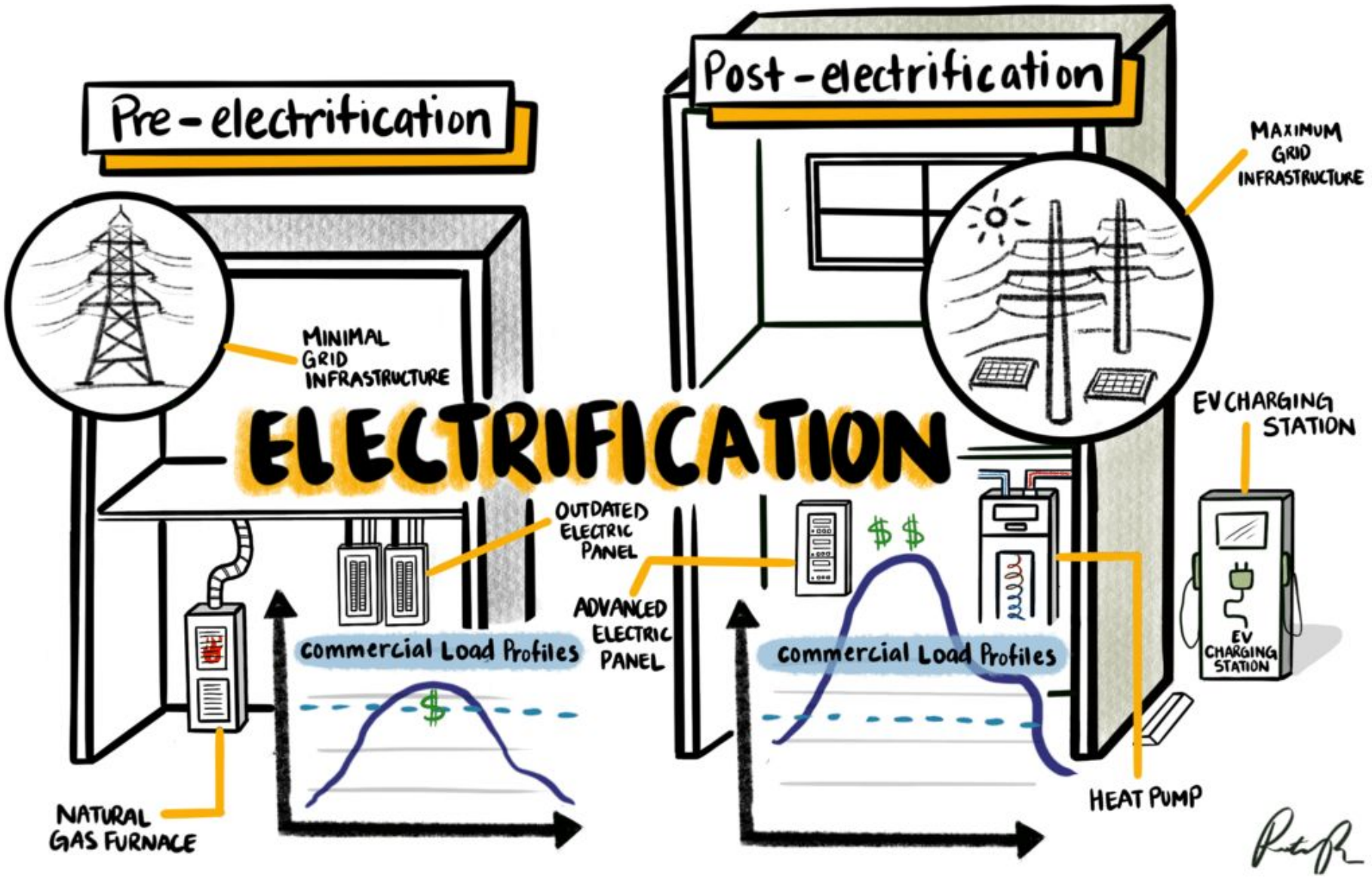


Illustration by Rita Perez, Institute for Market Transformation

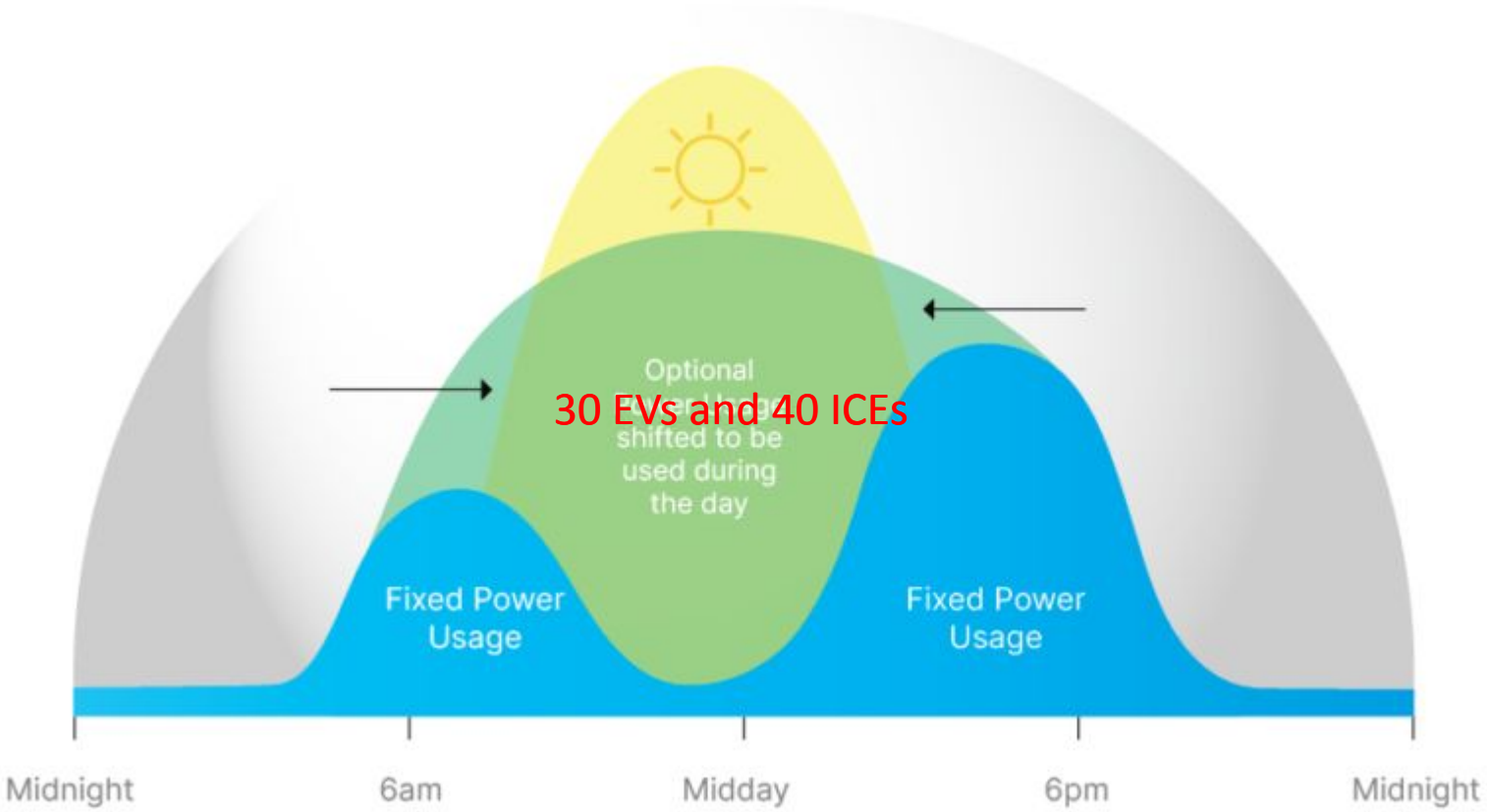
The Corp Yard -- 2022

- Built in 1961 and 1962
- 67 ICE vehicles
- 42 kW PV
- NG space and water heating
- Two electric meters

The Corp Yard -- 2030

- Built in 1961 and 1962
- 30 EVs and 40 ICEs
- 14 L2 + 1 DCFC charging stations (54,647 kWh a day)
- 42 kW PV
- NG space and water heating
- Three electric meters

Can you reduce or shift demand?



- What can you move to off-peak?
- Can you store solar energy?
- What are your fixed loads?
- What can you add?

The Corp Yard -- 2030

- Built in 1961 and 1962
- 30 EVs
- 14 L2 + 1 DCFC charging stations with load management software
- 42 kW PV + 65 kW PV
- All electric heat pumps and waste heat recovery
- Building automation
- Battery energy storage

Implementation Checklist

Develop a Procurement Strategy

- ❑ Articulate the motivations to transition the fleet
- ❑ List the benefits to City residents
- ❑ Set a timeline for implementation

❑ Assess Fleet Vehicles

- ❑ Identify vehicles' duty cycles and operating requirements
- ❑ Associate each vehicle with a "home base" facility
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Implementation Checklist

Develop a Procurement Strategy

- ❑ Create a phased plan for vehicles and EVSE
- ❑ Select an owner/operator model for charging stations
- ❑ Identify potential incentives and rebates
- ❑ Determine a budget and financial strategy

Purchase and Install the First Phase

- ❑ Create specs
- ❑ Issue RFP/use contract
- ❑ Install hardware and software
- ❑ Apply for incentives and rebates

Create Policies and Train Staff

- ❑ Adapt existing or create new policies
- ❑ Train drivers and fleet staff about EVs and EVSE
- ❑ Train staff on data collection and reporting tools

Evaluate Performance and Use

- ❑ Establish metrics and measure (week/month/quarter)
- ❑ Reevaluate the EV transition plan

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Thank you!

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