



Integrating EV Data

From Chargers & Other Sources

In 2022, OEM Order Books Opened for EVs Across All Duty-Cycles



Procurement is not the finish line

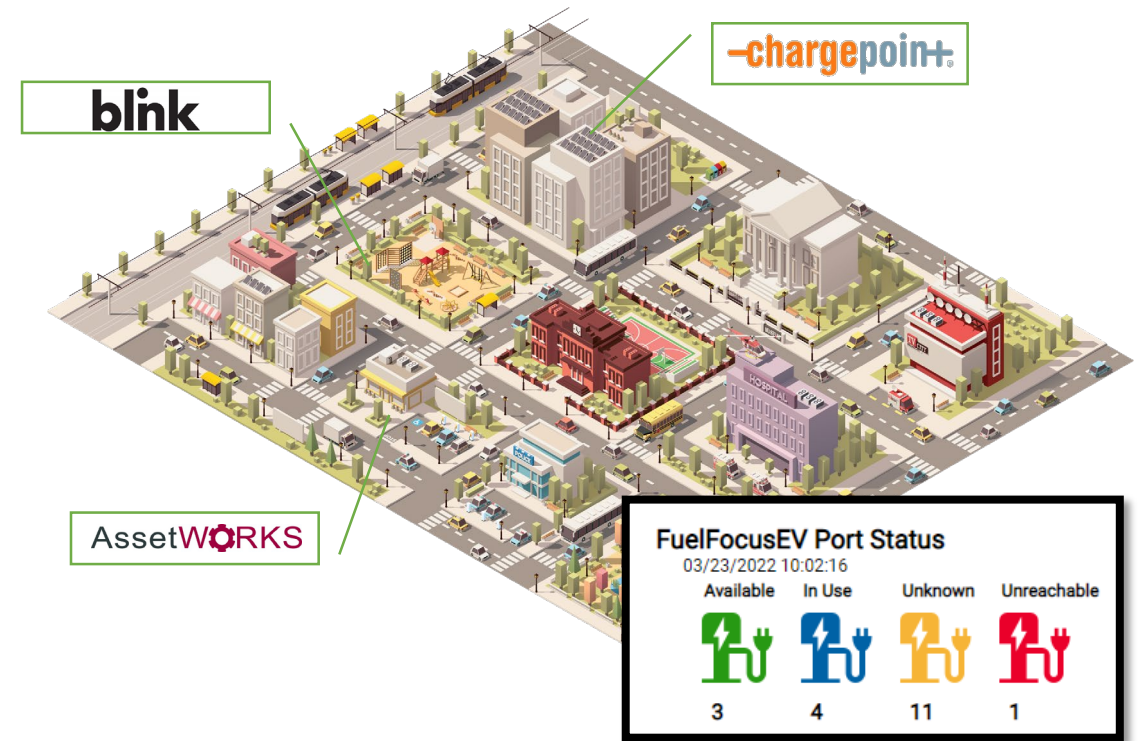
- ⚙️ **Gasoline asset and fuel mgmt. requirements apply to EVs too**
- ⚙️ **Key considerations:**
 - Managing and tracking fuel costs
 - Tracking vehicle lifecycle costs
 - Billing back to internal departments
 - Addressing both internal and external charging transactions



Fleet Charging Offerings

Vision and Direction

- ⚙️ Multi-network, multi-solution environments
- ⚙️ Deploying unique, tailored solutions for:
 - Fleet
 - Light-Duty
 - Heavy-Duty
 - Off-Road
 - Public
 - Workplace
 - Advanced use-cases (V2X, DERS)



Electricity is a fuel unlike any other....

⦿ Different sources

- Grid
- Distributed resources (e.g., solar)

⦿ Different rates

- ⦿ Each facility may have a different utility rate structure
 - Rates can change seasonally
 - Locations with dedicated meters may use special EV-only rates

⦿ Average cost per KWH will change based on:

- Time-of-use
- Peak demand at each meter every month
- Other factors



Integration Examples

Option A: AssetWorks CMS

Option B: Third-Party Partner Integration

Option C: ECU Pilot

Enterprise Software:



Interface:

Blink Cloud Service- FuelFocusEV Third-Party Integration
 ChargePoint Cloud Service- FuelFocusEV Third-Party Integration

Software:



Hardware:



Other Commercial Fuel Upload Options

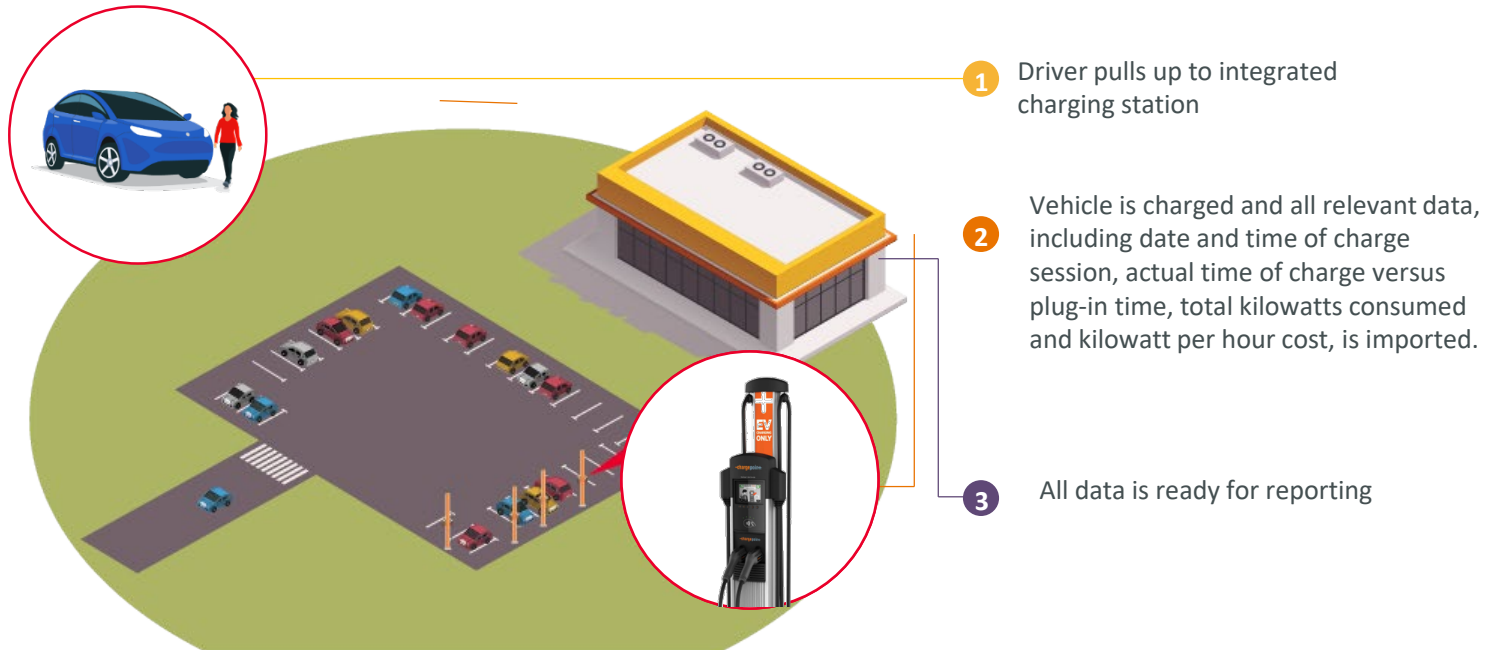
M5

- ⚙️ Interface Module: Load fuel transactions from file. Requires standard Interface License.
- ⚙️ API Module: Commercial fuel can be imported via AssetProductIssue with license.
- ⚙️ Smart App Commercial Fuel Entry: Operators use manual entry in the app which interfaces into FleetFocus with license.

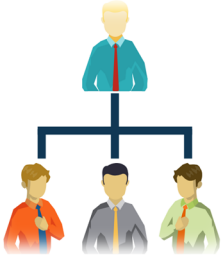
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- ⚙️ Fuel Data Load: Load transactions from file. No license required.
- ⚙️ API Module: Commercial fuel can be imported via AssetProductIssue with license.
- ⚙️ Smart App Commercial Fuel Entry: Operators use manual entry in the app which interfaces into FleetFocus (license required).

Charger Integration- The Driver Experience



Cost and Usage Analysis- Segmentation



✓ Internal Departments



✓ Asset Class or Individual Vehicles



✓ Location

Addresses and Tracks Variability

- ⚙️ Different Sources
 - Grid
 - Distributed Resources (PV, Co-gen)
- ⚙️ Different Rates
 - Each facility may have a different utility rate structure
 - Rates can change seasonally
- ⚙️ Average cost per KWH will change based on changes in usage due to
 - > Time-of-use
 - > Overall demand
 - > Other factors
- ⚙️ Very possible to spend more electricity than gas/diesel



See Impact of Management Decisions

Despite cost complexity, can manage many aspects to shape price

⚙️ Can Control

- Time of charging
- Speed of charging (power)
- Utility rate type
- Electricity source
- Peak demand

⚙️ Can't Control

- Number of shifts
- Duty-cycle requirements
- Utility rate design



Consider Different 'Types' of Electricity



180KW off grid DC Fast Charger and genset supporting transit fleet ops

Fuel Cost Variability

Charging costs are difficult to track without software and impossible to analyze/segment without integration. Key cost components are generally:

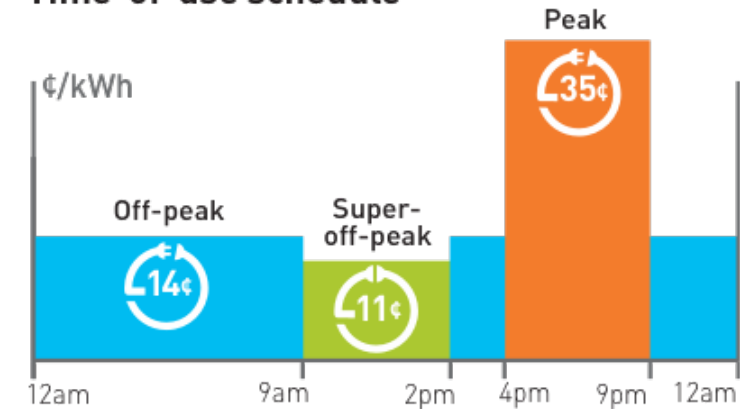
⦿ Time-of-Use Rates

- Vary by time and can increase the costs by 3x
- Encourages charge scheduling

⦿ Peak Demand Charges

- Tripped by peak electricity use in a 15- or 30-minute period.
- Can be majority of electricity cost
- Requires additional hardware to monitor
- Encourages load balancing

Time-of-use schedule*



Light Duty Fuel Cost Example

- Ten F -150s (300mile range)
- Need to fill from 15% to 100% (153.6 KW)
- Takes 8 hours (80amps)
- Assume Demand Holiday Rate

Bad Time of Use Example

	One Truck Cost	Ten Truck Cost
Time of Use 4-9 PM (\$0.35 per kwh)	\$33.60	\$336.00
Time of Use 9pm- 12am (\$0.14 per kwh)	\$8.06	\$80.60
1 Night Total	\$41.66	\$416.60

Good Time of Use Example

	One Truck Cost	Ten Truck Cost
Time of Use 9pm- 5am (\$0.14 per kwh)	\$21.50	\$215.00

Scheduled Charging Scenario with 50% Reduction in Costs



HD Fuel Cost Example

Example: Fifty Class 8 trucks at a LA area facility using no more than forty 150kw DCFC at a time

Rate Type	Time of Use	Demand	Total Bill	Cost per kWh	Notes
Demand Holiday Year 1-5	\$636,364	\$0	\$639,424	\$0.15	Approx. 46% of energy costs from demand charges at full imposition in Year 11.
Demand Holiday Year 11	\$525,505	\$437,338	\$965,904	\$0.22	Approx. 71% of energy costs from demand charges
TOU	\$350,796	\$883,764	\$1,237,621	\$0.28	
Demand Subscription	\$725,817	\$70,964	\$796,781	\$0.18	

AssetWorks Insight- “Mileage May Vary: Time of use and demand rates are difficult to estimate. Actuals may vary significantly from forecast amounts. EV charging at scale is almost impossible to monitor and manage without charging software integrations.



Source: <https://cdn.gladstein.org/pdfs/whitepapers/california-fleet-electrification-case-study.pdf>

Rate Choice

Example: Fifty Class 8 trucks at a LA area facility using no more than forty 150kw DCFC at a time

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Different gas. and diesel blends = Different electricity types & rates



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High-Usage Vehicles Are Susceptible to Demand Charges

Table 34. Yard tractor electricity cost analysis results

Scenario	Standard 2-Shift UTR	Extended 2-Shift UTR	Average UTR	Standard 2-Shift UTR	Extended 2-Shift UTR	Average UTR	Standard 2-Shift UTR	Extended 2-Shift UTR	Average UTR
Utility	SCE			LADWP			SCE		
Rate Schedule	TOU-EV-9	TOU-EV-9	TOU-EV-9	TOU A-3	TOU A-3	TOU A-3	TOU-8 Option E	TOU-8 Option E	TOU-8 Option E
Daily Energy (kWh)	287	341	N/A	287	341	N/A	287	341	N/A
Daily Operating Time (hours)	16	19	N/A	16	19	N/A	16	19	N/A
Charge Window	3a-8a, 5p-5:45p	6a-8a, 6p-6:45p	N/A	3a-8a, 5p-5:45p	6a-8a, 6p-6:45p	N/A	3a-8a, 5p-5:45p	6a-8a, 6p-6:45p	N/A
Total Energy (kWh)	104,886	124,553	114,720	104,886	124,553	114,720	104,886	124,553	114,720
Peak Power (kW)	94	166		94	166		94	166	
Energy Charges	\$15,103	\$20,578	\$17,841	\$13,072	\$15,697	\$14,385	\$12,743	\$17,038	\$14,890
Demand Charges	\$5,370	\$9,482	\$9,482	\$17,337	\$18,487	\$18,487	\$11,869	\$20,958	\$20,958
Fixed Charges	\$3,061	\$3,061	\$3,061	\$900	\$900	\$900	\$3,061	\$3,061	\$3,061
Total Cost (\$/year)	\$23,534	\$33,121	\$30,384	\$31,309	\$35,084	\$33,771	\$27,673	\$41,057	\$38,910
Average Cost (\$/kWh)	\$0.224	\$0.266	\$0.265	\$0.299	\$0.282	\$0.294	\$0.264	\$0.330	\$0.339

1 hour difference in charging schedule results in a \$7,000 to \$10,000 difference per truck in annual fuel costs.

Choose Your Method

Option A: AssetWorks CMS

Option B: Third-Party Partner Integration

Option C: ECU Pilot

Enterprise Software:



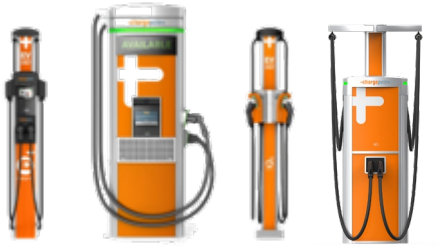
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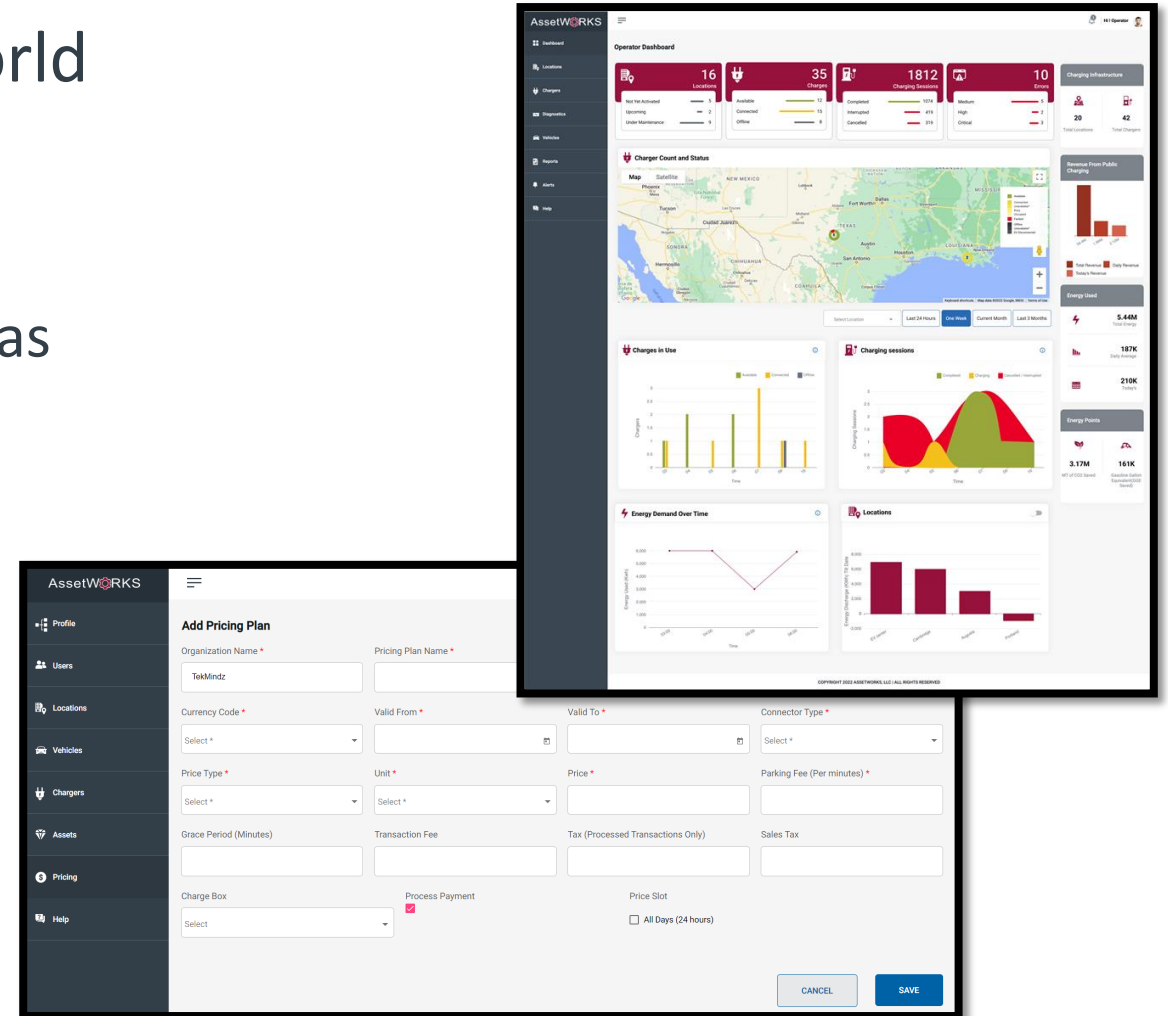


Hardware:



Precision Detail with the right CMS

- ⚙️ Configure pricing to match real-world
- ⚙️ Set pricing based on:
 - ✓ Seasonal utility rates
 - ✓ Locations/Meters/Utility Service Areas
 - ✓ Type of Charging (AC v DC)
 - ✓ Specific chargers
 - ✓ Driver behavior



Third Party Charger Integration Process



UPDATE
FleetFocus/EAM (if needed)



SCHEDULE
the FuelFocusEV implementation with AssetWorks



GATHER
charger name and RFID card information.



KICK-OFF
with AssetWorks to enter interface inputs and update fuel settings.



MODIFY
Interface testing if needed due to past FA & M5 customization



CLOSE-OUT
after user testing is complete and the interface is moved from test to production

Complete setup can take weeks to a year if updates or customizations are needed.

Closing Thoughts on Integration

- ⚙️ Electricity is complex and difficult to manage without software
- ⚙️ Integrate “when small and early”
- ⚙️ Understand what charging systems your FIMS provider supports and doesn’t





Questions and Discussion...

Contact Info:

Mike Terreri

Michael.terreri@assetworks.com

[Linkedin.com/in/terreri](https://www.linkedin.com/in/terreri)

Asset**WORKS**