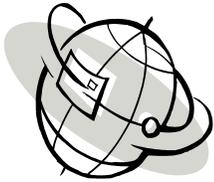


# Energy Issues

## IEP Newsletter



### U.S. Electric Vehicle Sales Status Report

By: Thomas D. Mull, PE, PEM, CEM

In 2018 U.S. electric vehicles sales increased by 81%\*. It was due, in large part, to a strong fourth quarter fueled by a dramatic increase in sales of the Tesla Model 3. Of the 305,602 units sold by the top ten producers, Tesla reported sales of 139,782 Model 3 units, easily outpacing the second best seller (Toyota Prius with 27,595). Tesla's overall sales (including their Models X & S) totaled 191,627, representing over 60% of all EV sales in the U.S. (See chart below – Source: Insider EV dated: January 7, 2019)

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#### 2018 Monthly Sales Chart

2018 U.S. EV SALES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Tesla Model 3*	1875	2485	3820	3750	6000	5902	14250	17800	22250	17750	18650	25250	139,782
Toyota Prius Prime	1496	2050	2922	2626	2924	2237	1984	2071	2213	2001	2312	2759	27,595
Tesla Model X*	700	975	2825	1025	1450	2550	1325	2750	3975	1225	3200	4100	26,100
Tesla Model S*	800	1125	3375	1250	1520	2750	1200	2625	3750	1350	2750	3250	25,745
Honda Clarity PHEV*	604	911	1131	1129	1639	1495	1542	1462	1997	2025	1897	2770	18,602
Chevrolet Volt*	713	983	1782	1325	1675	1336	1475	1825	2129	1475	2530	1058	18,306
Chevrolet Bolt EV*	1177	1424	1774	1275	1125	1083	1175	1225	1549	1975	2825	1412	18,019
Nissan LEAF	150	895	1500	1171	1576	1367	1149	1315	1563	1234	1128	1667	14,715
BMW 530e*	224	413	689	518	729	942	536	749	756	733	1012	1363	8,664
Ford Fusion Energi	640	794	782	742	740	604	522	396	480	453	1131	790	8,074

Figure 1 – EV 2018 Sales

The growth rate of electric vehicle sales in the U.S. has been steady, with a 26% increase in 2017 and 81% in 2018. (See Chart on the following page.) Continued growth, however, has not reflected equally among producers. According to *Clean Technica*\*\* , 2018 sales as compared to 2017 were down for the following models: Chevy Bolt (-24.8%), Ford Focus Electric (-68.9%), Tesla Model S (-7.1%) and the Volkswagen e-Golf (-60.4%). If the three (3) Tesla models were removed from sales statistics, *Inside EV* reports U.S. sales for 2018 would have been up only 11% over last year.



Figure 2 – Tesla Model 3

\* Source: *Inside EV*  
\*\* A website devoted to the promotion of clean energy.

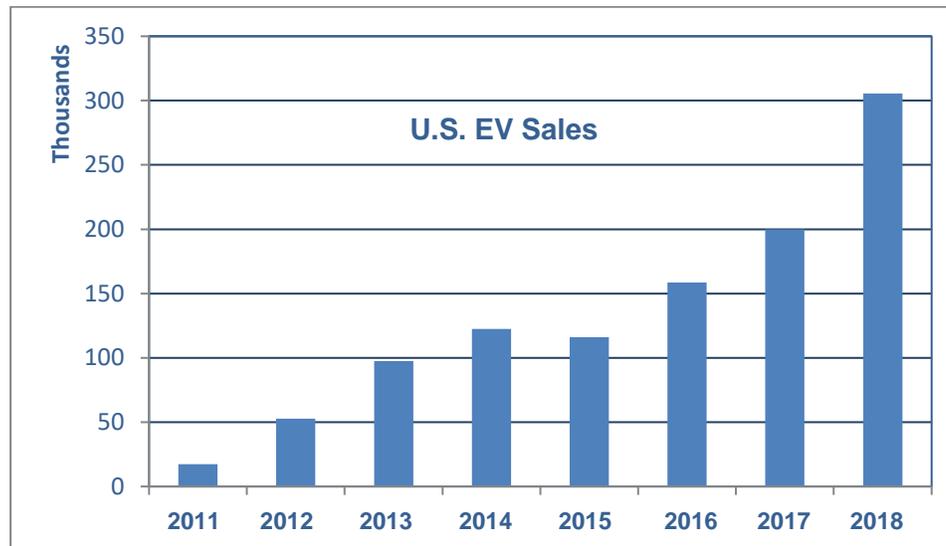


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### *U.S. Electric Vehicle Sales Status Report (continued)*



Data Source: Inside EV

Figure 3 – EV Sales 2011 - 2018

For 2019 the industry appears to be focused on three market segments:

- The mass market appeal for an EV with an electric range of greater than 200 miles per charge is growing. This will be an area of focus for manufacturers including Kia, who will have two offerings this year.
- High performance electric cars from Jaguar, Mercedes, Porsche, BMW and others will build upon this market segment pioneered by Tesla.
- Significant participation is expected from major manufacturers in the luxury crossover and SUV markets.

There is no doubt environmental concern along with incentives\* have fueled interest in electric vehicles. This has been reflected in increased sales. The overall cost-effectiveness of EVs, however, has not been established.

There are advantages to both EVs and gasoline-powered cars. Electric vehicle proponents often cite the cost per mile driven for an EV at about half (or less) that of a gasoline-powered vehicle. While impressive, this does not reflect the overall cost of ownership. The question of cost-effectiveness is highly dependent upon the specifics of the vehicles under consideration (number of passengers, price, engine size, etc.), required mileage to be driven, and the specific location. The cost for vehicles, fuels and even incentives vary across the U.S., thereby impacting the life-cycle cost of a vehicle. So, the question of which vehicle has the lowest overall cost of ownership is not easily answered: *It depends*.

Due to the increased number of models available and their range (miles/fill-up), the advantage appears to favor gasoline-powered vehicles. However, technology could change this. Enhanced batteries that provide extended ranges (350-500 miles/per charge) and power that approaches gasoline-powered vehicles, along with increased offerings, would likely result in greater overall customer acceptance.

\* The U.S. Internal Revenue Service (IRS) tax credit is for \$2,500 to \$7,500 per new EV purchased for use in the U.S. The size of the tax credit depends on the size of the vehicle and its battery capacity. See IRS guidelines for details and qualifying vehicles. Check the DSIRE database ([www.dsireusa.org](http://www.dsireusa.org)) for state incentives.

## Energy Management Case Studies

*Submitted By: ILL Personnel*

JLL (Jones, Lang LaSalle, Incorporated) is a global professional services and management company specializing in real estate. They are headquartered in Chicago, IL, but have offices in London, Singapore and Moscow.

JLL has management responsibility for the primary government facilities for the State of Tennessee. In 2017 IEP conducted the three-week PEM Training Program for the State of Tennessee in Nashville. Local JLL personnel participated in the program. Following are three (3) project case studies submitted by JLL participants highlighting achieved and projected savings. – Staff Writer

### Case Study 1: The State of Tennessee - TBI HQ, Nashville, TN - Boiler Replacement

#### Situation

- The TBI HQ had an old Ajax brand boiler rated at 8 million BTUs. The unit was old, inefficient, and unreliable.

#### Approach

- The JLL team worked with a local boiler company to specify a new boiler.
- Since the days of the Ajax boiler, many high tech improvements have been made to the design and construction of boilers.
- While operating efficiencies have been increased to as high as 98%, the actual footprint of the boiler has been greatly decreased.

#### Results

- Working closely with a local boiler company, the JLL team was able to install a new condensing boiler rated at 3 million BTUs.
- This is a 40% reduction in size and energy consumption.
- \$71,480 project cost
- \$60,000 estimated annual energy plus maintenance and repair savings.
- A 1.19 year ROI for the State



Figure 1 – Old Boiler



Figure 2 – New Boiler

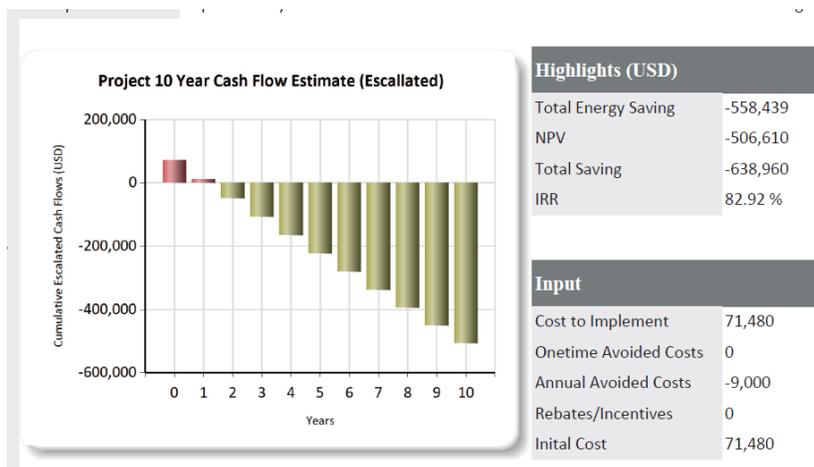


Figure 3 – Project Cash Flow Estimate

## Energy Management Case Studies

(continued)

### Case Study 2: LED Lighting Proposal for Harman Franklin, KY

#### Situation

- Currently, there are (64) 400 watt metal halide fixtures in the shipping/receiving area operating 24/7/365
- The average life span of the metal halide lamp is 3 years and the life span of the ballast is 6 years.
- One production floor (36,000 sq. ft.) utilizes 3,840 T8 lamps operating 24/7/365
- Current annual expenditure for both areas is \$152,069



Figure 4 – Shipping/Receiving

#### Approach

- High quality, with a reputable brand - LED interior/exterior retrofit – Warranty 100,000 hours or 10+ years – Controls can extend life to 20-25 years
- Occupancy controls and CO<sub>2</sub> monitoring would be ideal for improved IAQ
- Lighting level tests must be conducted in conjunction with photometric design review to ensure proper source color temperature and illumination levels



Figure 5 – Production

#### Results

- \$120,094 annual energy cost savings
- \$22,000 annual M&R savings
- \$50,000 install cost
- IRR = 479%
- Simple payback = 3.5 - 4 month's

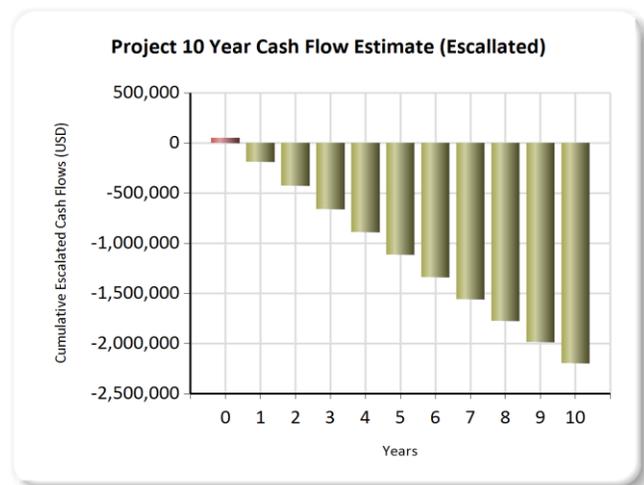


Figure 6 – Cash Flow Estimate

### Case Study 3: Porter Agricultural Lab, Nashville TN

#### Situation

- The building occupants complained the doors in the space are hard to open.

#### Approach

- In the JLL / State of Tennessee Chief Engineer Training program, we talk about the "5 Whys" of problem solving. The idea is to get to the root cause of a problem by asking "why" at least 5 times or as many times as needed to solve the problem.

## *Energy Management Case Studies*

*(continued)*

### Approach (cont.)

- “Why”? The static pressure was too high causing back pressure on the doors.
- “Why”? The digital controls in the building automation system were not properly controlling the static pressure.
- “Why”? One of the digital sensors in the space was sending a false signal to the BAS system. The bad sensor was replaced and conditions improved, but still not right.
- Why? Found a control wire on terminal #13 that should have been on terminal #12. Control wire was changed and condition improved further, but still not right.
- “Why”? Found pneumatic tubing coiled up above the ceiling that was designed to be mounted below the ceiling to accurately read the static pressure in the occupied space.
- The tubing was properly mounted in the space and the problem was solved.

### Results

- The occupants can now easily open all doors.
- Estimates indicate a \$28,000 annual energy savings for the State.



Figure 7 – JLL Team



Figure 8 – Control Wiring



Figure 9 – Coiled Pneumatic Tubing

## *Oil Price Rollercoaster – Here we go again!*

*By: Staff Writer*

In the Fourth Quarter 2018 IEP Newsletter there was an article entitled “Crude Oil Price Exceeds Predictions”. The main point of the article was to highlight the continued volatility of crude oil pricing as it surpassed the projected ceiling of US\$60-\$70 per barrel. In mid-October the Nymex price approached US\$72.00, as Brent Crude neared US\$81.00 per barrel. The concluding statement in the article was: *“The futures forecast, as of this writing, has the one year Nymex forecast for crude at US\$79.00 per barrel. Time will tell.*

*(continued following page)*

## *Oil Price Rollercoaster – Here we go again!*

(continued)

From that point the price of both Nymex and Brent Crude continued to drop dramatically until late January, where the Nymex price was less than \$44.00 per barrel. As of February 14<sup>th</sup> the Nymex price for crude was US\$54.28 and Brent Crude was US\$64.36 per barrel.

There are multiple reasons for the dramatic drop over the past few months. They include OPEC's move to *decrease* production by 1.2 million barrels per day, being more than offset by increased production from Russia and Saudi Arabia. However, a more significant factor is the increased supply from shale oil production. This current oversupply has resulted in the lowest crude oil prices since late 2017.



Figure 1 – Nymex Crude Oil

Chart Source: Nasdaq.com

It is simply the Econ 101 principle of supply and demand in action. Oversupply forces prices down. How much longer this will last is anyone's guess. The President wants lower oil prices to fuel a resurging U.S. economy. As long as shale oil is a major producer we can expect to see relatively stable oil pricing. *Market Watch* oil futures indicate that the price of WTI crude should not exceed US\$56.00 per barrel throughout 2019.

While this is good for the consumer, we should not lose sight this is a volatile commodity. Further sanctions on oil producing countries, a drop in production due terrorist activity, a decision by OPEC or others to reduce production could reverse this trend. How long lower prices will last; *Time will tell.*

