



# MUNRO



## 2022 FORD F-150 LIGHTNING<sup>TM</sup> PLATINUM COST ASSESSMENT





## **FORD LIGHTNING™ PLATINUM DESCRIPTION**

- The 2022 F-150 Ford Lightning™ Platinum all-electric full size pick-up truck which Munro analyzed is the 4x4 SuperCrew model with dual electric motors and extended range battery.
- The Platinum is powered by a 131 kWh battery offering 580-horsepower using two permanent magnet motors to deliver 775 lb-ft of torque. The 131kWh battery pack has an estimated 300-mile range.
- Additional features include the carbon black fixed extended running boards with enhanced lighting, spray-in bedliner, max trailer tow package and Ford's "BlueCruise" Level 2 autonomous driver-assistance technology.

<b>2022 Ford Lightning Platinum</b>	
<b>4x4 SuperCrew Extended Range</b>	
<b>Maximum Seating</b>	5
<b>Power (HP)</b>	580 hp
<b>Torque (lb-ft)</b>	775
<b>Motor Type</b>	PMSM
<b>Wheelbase (in)</b>	145.5
<b>Front Suspension</b>	Independent double-wishbone with coil-over shock, stabilizer bar
<b>Rear Suspension</b>	Independent semi trailing arms, coil springs, stabilizer bar
<b>Weight as Received (lbs)</b>	
<b>Overall Length (in)</b>	232.7
<b>Pickup Box</b>	5.5-Ft. Styleside

## **FORD LIGHTNING™ PLATINUM COST ASSESSMENT REPORTS**

These reports provide a comprehensive vehicle cost analysis that are highly advantageous for OEMs or Tier Suppliers looking to effectively compete the EV marketplace.

Each report is a consolidation of Munro's technical findings related to cost, features, performance, and technology implementation including Executive Summaries, Eye-Catching Features and Quick Cost Estimates.

Several Ford Lightning™ reports are available for purchase.

### **ZONE 1-4 REPORTS**

■ Zone 1 Body and Chassis	\$24,000
■ Zone 2 Controlling Electronics (LV)	\$28,500
■ Zone 3 Interiors and Safety	\$22,500
■ Zone 4 Powertrain and Battery Pack, HV Cables	\$33,750

**Purchase Zones 1 – 4 for \$97,500 to receive a 12% discount**

### **FOCUSED REPORTS**

■ Electric Drive Module (Motors, Gearbox and Inverters)	\$35,000
■ Thermal Systems (Cooling & Heating)	\$15,000
■ High & Low Voltage Electronics	\$35,000
■ Selections from Zones 1-4, plus additional content including Communication Architecture and ECU details	

### **NOTE**

- Additional report bundling options are available at a reduced purchase price
- Custom reports are available upon request
- Please direct purchase inquiries to [sales@leandesign.com](mailto:sales@leandesign.com)



# LIGHTNING



## ZONE REPORTS

Zones 1 – 4 provide a system by system break down of the Ford Lightning™. Each report contains detailed cost information down to the component level and supporting technical information as outlined below.

## EXECUTIVE SUMMARIES

- The Executive Summary highlights the points of each report including Munro's observations and cost summaries.
- Side by Side comparisons highlight prominent EVs and their associated specifications, features, integration strategies and other relevant data.

### EDM Side-by-Side Comparison

Battery Electric Vehicles (BEV)- Permanent Magnet (PM) Motors

Parameters	Tesla Model 3 Rear	BMW i3	Chevrolet Bolt	Jaguar I-PACE	Nissan Leaf	Tesla Model Y Rear	Tesla Model S Plaid
Motor Type	PM	PM	PM	PM	PM	PM	PM
Total Motor Weight (lb)	11.1	10.5	11.5	10.5	11.5	11.5	11.5

### Controlling Electronics Summary

**2022 Ford Lightning**

**ADAS**

The Lightning can be equipped with Ford Blue Cruise™ which allows hands-free driving on limited sections of divided highways. While Blue Cruise™ is active, it functionally couples both adaptive cruise control and lane centering at the same time. These designated highways are referred to as Blue Zones. As for the hands-free aspect, there is a driver monitoring camera positioned between the instrument cluster and infotainment screen which does require the driver to be alert and ready to take the wheel should the vehicle disengage from Blue Cruise™. It should be noted that Blue Cruise™ does NOT make the vehicle fully autonomous. As such, the driver should always be ready to take control of the vehicle. As with most ADAS (Advanced Driver Assistance Systems), Blue Cruise™ is more of a comfort feature than a safety feature. The system does illuminate certain parts of the instrument cluster with blue lights to indicate when the vehicle is in a Blue Zone. When not in a Blue Zone, the vehicle will only handle Adaptive Cruise Control.

The Lightning uses a conventional system:

- A forward-facing camera for adaptive cruise control
- A forward-facing radar for adaptive cruise control
- Two front corner radar for lane departure warning
- Two rear corner radar for blind spot monitoring
- Eight ultrasonic sensors on each side

### 2022 Ford F-150 Lightning Overview

Ford's F-150 Lightning is an all-electric all-wheel drive full size pickup truck powered by either a 98 kWh (standard) or 131 kWh (extended) battery, delivering an EPA estimated range between 230 miles and 320 miles (depending on configuration) and standard seating for five passengers.

- The Lightning offers a 5.5' cargo bed with 52.8 ft³ of space. Dry storage of 14.1 ft³ is available under the hood.
- The Lightning is propelled by two permanent magnet electric motors with a combined 775 lb-ft of torque. Power is limited by the battery, with 452 hp for the standard and 580 hp with the extended range battery.
- The Lightning is equipped with "BlueCruise" Level 2 autonomous driver-assist technology.


Interior Dimensions		Weights	
• Passenger Capacity	5	• Base Curb Weight (lbs)	6,015 (est.)
• Cargo Volume (ft³)	14.1	• Extended-Range Curb Weight (lbs)	6,590
• Front Head Room (in)	40.8	<b>Exterior Dimensions</b>	
• Front Leg Room (in)	43.9	• Wheelbase (in)	145.5
• Front Shoulder Room (in)	66.7	• Length, Overall (in)	232.7
• Front Hip Room (in)	62.5	• Width, Max w/o mirrors (in)	80
• Second Head Room (in)	40.4	• Height, Overall (in)	78.3
• Second Leg Room (in)	43.6	• Track Width, Front (in)	68.1
• Second Shoulder Room (in)	66.0	• Track Width, Rear (in)	68.3
• Second Hip Room (in)	62.6	• Drag Coefficient	N/Aval



The model which this study is based on is the Mustang Mach-E Select Series

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## EYE-CATCHING FEATURES


- Munro has identified specific observations of interest which are called "Eye-Catching Features." These observations represent advantages and/or disadvantages in cost, weight, feature content, or performance as related to design, material choices, assembly or manufacturing process selection.



2022 Ford Lightning
Cantilevered Harness
Eye-Catching Features 

**Description:**


- The main wire harness clips
- The additional harness line clips rather than staples



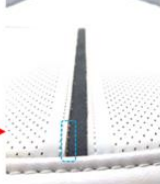
2022 Ford Lightning
Symmetrical Chiller Bracket
Eye-Catching Features 

**Description:**

- The chiller bracket has symmetrical fasteners
- The bracket is fastened with a U-nut on the other side
- The remaining fastener slots are unused

2022 Ford Lightning
Two-Tone Seat Covers
Eye-Catching Features 

**Description:**

- The seat covers have a two-tone finish with an Alcantara strip down the center
- Even though the leather around the Alcantara is stitched in place, it is not hemmed, which exposes a portion of the leather's B-Surface

**Advantages:**

- Two-tone creates a unique look, especially for the vehicle's highest trim level to date
- Breaking up the leather into smaller panels allows greater flexibility in hide yield which in turn lowers material cost

**Disadvantages:**

- Un-hemmed leather edges appear frayed, which is further exacerbated on contrasting colors
- Additional cutting and sewing operations add cost

## QUICK COST ESTIMATES

- The Lightning is broken down into systems and components for Quick Cost Estimating (QCE.) QCE is Munro's proprietary methodology developed in response to the need for speed-driven results and is quickly gaining popularity. Quick Cost estimates rapidly provide the customer with approximate versus detailed costs, which are more expensive and time consuming to generate. This level of accuracy provides OEMs and Suppliers the ability to make sound comparisons and directional decisions.

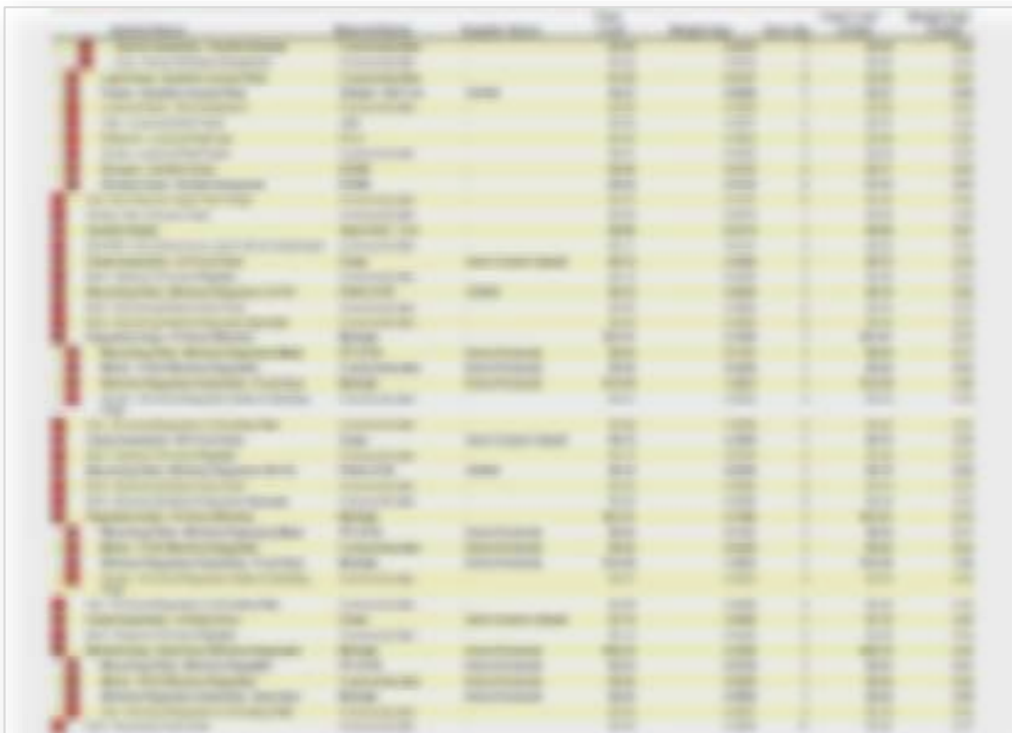
## RICHMAN FROM EPA

*"Munro is recognized as being technically competent, highly experienced, knowledgeable and creative in benchmarking and lean engineering of automotive and non-automotive systems. Costing models are thorough covering all elements of total production cost."*



## **COSTED BILL OF MATERIAL**

- The Summary Costed Bill of Material (CBOM) is a consolidated view of the information presented in the complete vehicle report or an individually purchased Zone report.
- The CBOM is in an indented format and includes:
  - Part name
  - Material
  - Supplier (as available)
  - Total Cost
  - Weight
  - Quantity
  - Total Weight

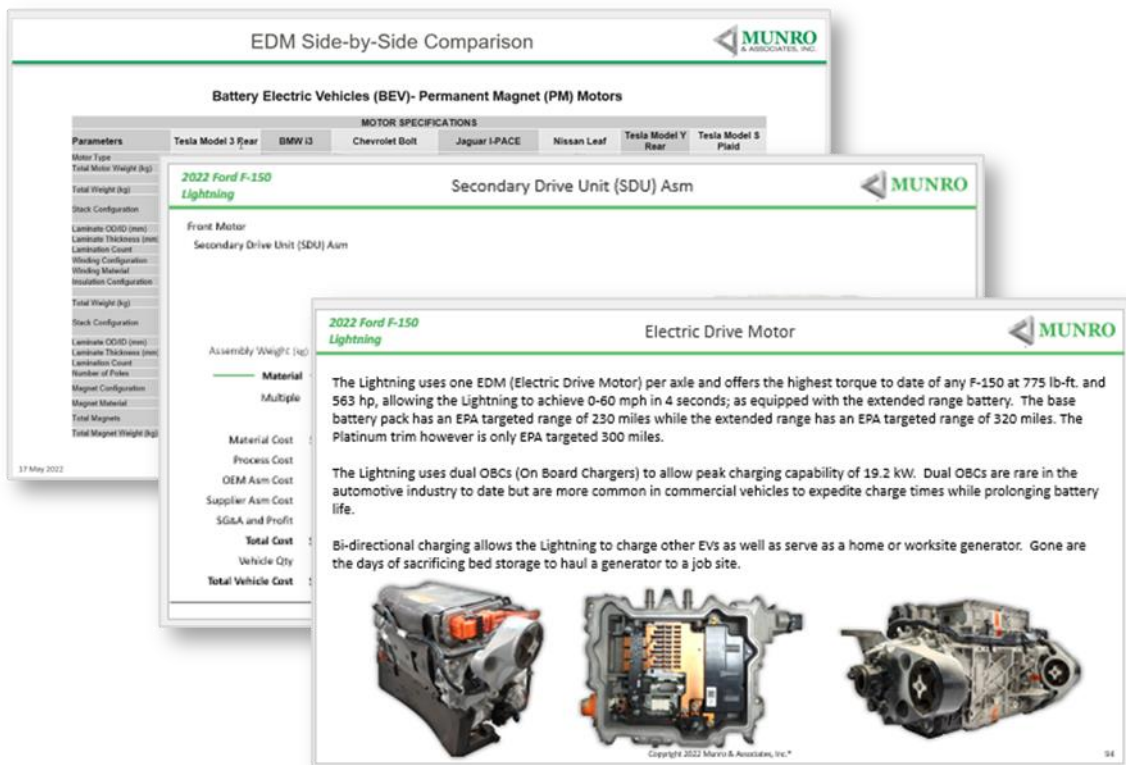


Part Name	Material	Supplier	Total Cost	Weight	Quantity	Total Weight
Engine	...	...	...	...	...	...
Transmission	...	...	...	...	...	...
Driveshaft	...	...	...	...	...	...
Front Suspension	...	...	...	...	...	...
Rear Suspension	...	...	...	...	...	...
Brakes	...	...	...	...	...	...
Wheels	...	...	...	...	...	...
Interior	...	...	...	...	...	...
Exterior	...	...	...	...	...	...
Electrical	...	...	...	...	...	...
Paint	...	...	...	...	...	...
Assembly	...	...	...	...	...	...

## FOCUSED REPORTS

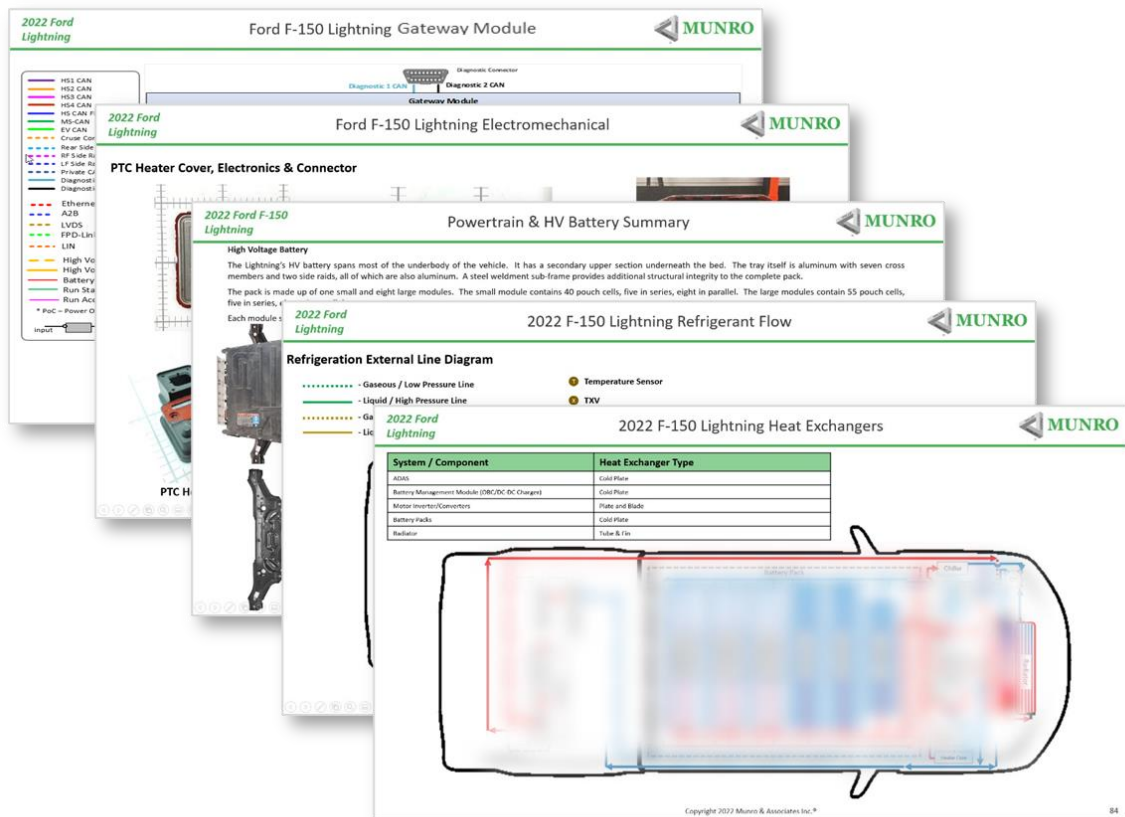
### ELECTRIC DRIVE MODULE (MOTORS, GEARBOX AND INVERTERS) REPORT

- The Electric Drive Module (EDM) cost assessment includes the Front Motor, Rear Motor, Inverter, Front Gear Box, Rear Gear Box, and several technical details of the motor design.



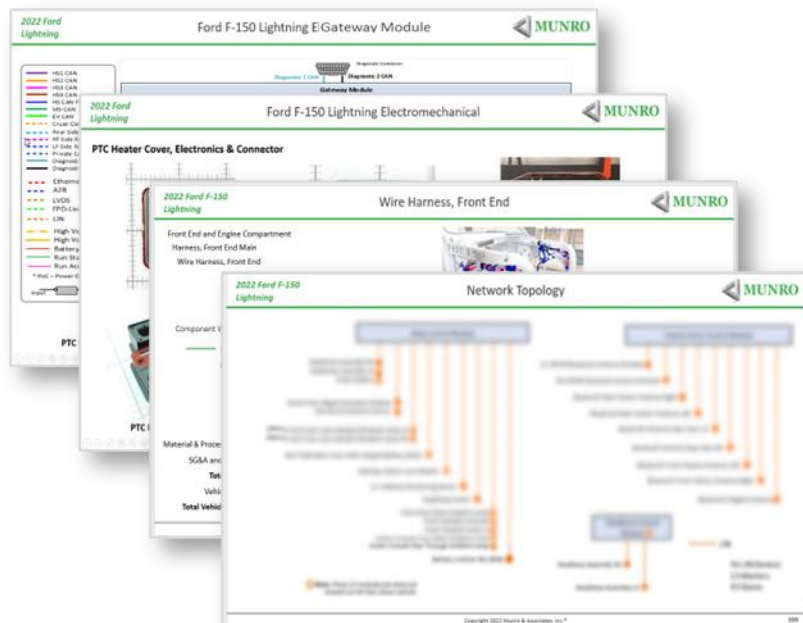
## THERMAL SYSTEMS (COOLING & HEATING) REPORT

- Cost and description of associated thermal system components. Heat exchangers, coolant and AC tubing, cold plates, heat pump, AC compressor, etc..
- Includes coolant tube diagram(s), flow diagram, AC diagram and flow paths for all control valves.
- Electrical diagrams showcase the following components: heat pump (solenoids / sensors / pumps), cabin sensors, component temperature sensors (ADAS, motors, batteries etc.), and network communications



# HIGH & LOW VOLTAGE ELECTRONICS REPORT

- Includes selections from Zones 1-4, including Electrical Topology, Communication Architecture and ECU details.
- The report outlines the vehicle's entire electrical system, including part names, materials, suppliers (as available,) weights, photographs, Eye-Catching Features and estimated costs for all high- and low-voltage components. The report contains the following sections:
  - **Communication Systems:** Networking, Antenna Locations, Over-the-Air (OTA) Updates
  - **ECUs**
  - **Integrated Circuit Summary:** Microcontroller, Memory, and Communication ICs identified by ECU
  - **Components by Function:** Antennas, Sensors, Switches, Actuators, Motors, Lighting
  - **Power Distribution & Wiring:** Fusing, Harness Diagrams, Connector Summary



## **REPORT DELIVERY**

- All reports and accompanying deliverables will be made available for easy access through a secure File Transfer Protocol (FTP) site.
- A user-friendly PDF format ensures that subscribers can easily locate a wide range of materials in addition to the reports.
- The large reports feature a linked table of contents, allowing users to easily navigate the report contents and quickly locate specific data.

## **FREQUENTLY ASKED QUESTIONS**

- **Was Ford involved in the study?**

No. Neither Ford's proprietary costs nor any of Ford's suppliers' quoted costs were used in this study.

- **Is there any Ford proprietary (stolen) IP in this report?**

No. All data was developed through Munro's proven methodologies, analyzing Munro's purchased production-version Ford Lightning.

- **Are the components costed using country-specific costing centers?**

Yes. Munro uses country-specific labor rates, factory floor costs, utilities, taxes, and SG&A for OEM and Tier Suppliers.

- **Is this a Costing or Pricing report?**

This is a Costing Report. Pricing has too many variables.

## **LEGAL DISCLAIMERS & SALES CONDITION**

- **How can I see the sample report before purchasing?**

Please contact [sales@leandesign.com](mailto:sales@leandesign.com) and we will provide sample information in digital PDF format. NOTE: Critical data will be blurred in the sample.

- **Is purchaser allowed to reproduce, distribute, disseminate, photocopy, fax, or transmit report content internally within the purchaser's organization?**

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- **If questions arise, is a Munro expert able to visit and explain the report's details?**

Munro will visit customers, if the customer pays for the travel and a daily fee.

- **If there are limited specific questions on the content of the report, is it possible for a Munro representative to support a phone call or e-mail communication?**

Yes, please contact [sales@leandesign.com](mailto:sales@leandesign.com) and we will respond with our answers.