



2020 Tesla Model Y  
Rear



2020 Tesla Model Y  
Front



2019 Jaguar I-PACE



2020 Nissan Leaf



2017 Tesla Model 3  
Rear



2018 Tesla Model 3  
Front



2019 Audi e-tron  
Front



2019 Audi e-tron  
Rear



2016 Chevrolet Volt



2016 Toyota Prius



2017 Chevrolet Bolt



2014 BMW i3

**NEW**

## Twelve Motor Cost and Benchmark Report

email [sales@LeanDesign.com](mailto:sales@LeanDesign.com) for a quote

Munro conducted a side by side motor comparison capturing detailed cost and component data

**Purchasers will receive a 488-page** benchmark report for twelve EV motors at a fraction of the estimated value of \$300,000 if purchased individually.

- A. Top level side by side comparisons
- B. Detailed section for each motor
- C. Motor technical cost analysis
- D. Appendix with additional motor information



## Description of the Motor Analysis

- A. Side by side motor comparing torque, power ratings, motor types, application, part count, cost and weight
- B. Each motor has a dedicated report section providing detailed dimensional data such as:
  - Overall dimensions and weights
  - Discreet part dimensions such as laminate thicknesses and counts
  - Gauss values of magnets
  - Pole counts
  - Magnet configurations
- C. Complete technical cost analysis of each motor
  - Includes the stator, rotor, rotor shaft and resolver target wheel
  - Excludes motor housings, gear train and controls
- D. Appendix with supplemental technical performance data and material chemical analysis

## Report Delivery

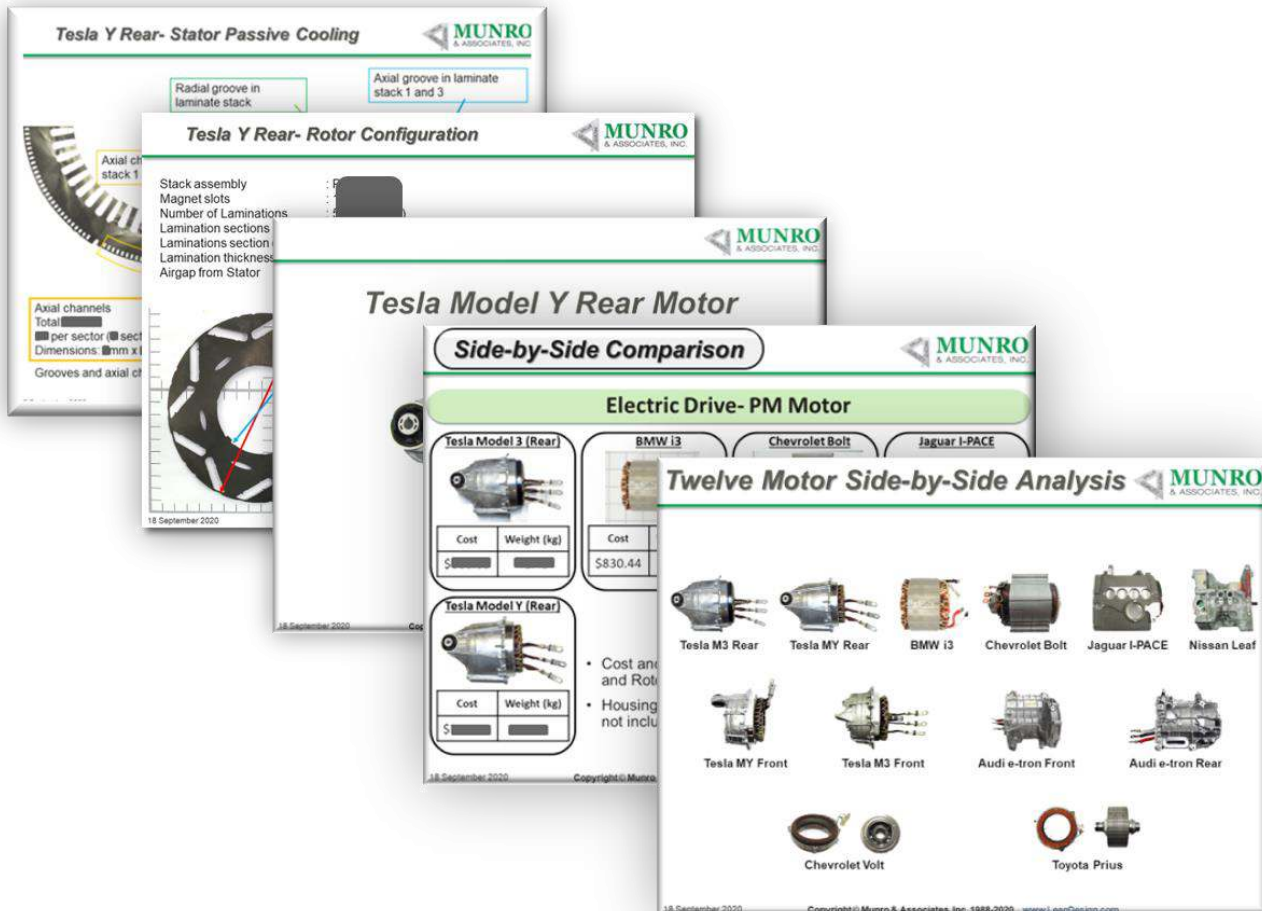
- ❖ All reports and accompanying deliverables will be made available for easy access through a secure File Transfer Protocol (FTP) site.
- ❖ The report utilizes hyperlinks within a table of contents to facilitate the ability to easily navigate throughout the contents and quickly find specific data and information to meet user needs.



## Motor Benchmark Report

The Benchmark Report is highly advantageous for OEMs or suppliers looking to effectively expand and compete in new EV markets.

- ❖ The report is a comprehensive cost analysis of each motor.
- ❖ This report contains descriptive and pictorial detail on every facet of the motors' dimensional data, manufacturing and cost analysis.
- ❖ Those who purchase the report will receive a single report containing:
  - a. Executive Summary
  - b. Side by Side Summary
  - c. Dimensional Data
  - d. Costed Bill of Material






## Cost Estimates

The costs of the motors are separated into two buckets; stator and rotor. Munro used their proprietary software and methodologies to establish a should cost to manufacture the various parts found in each of the motors. An overview of the costing methods is provided in the report. The costing methodologies have been developed by Munro over the last 15 to 20 years supporting numerous OEM's and suppliers as well as government agencies for future rule making decisions regarding fuel economy and safety standards.

### [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.”



**Instrument Panel Trim**

**Assembly Summary**

Zone	Zone 3 Interior & Safety						
System	Instrument Panel Trim						
Part	Passenger Footwell Substrate Assy						
<b>Task Model 3</b>							
Supplier Name/Code	Supplier Code	Material	Quantity	Unit Cost	Total	Unit Price	Unit Weight
Material		Steel	1.00	0.00	0.00	0.00	0.00
Parts		Steel	1.00	0.00	0.00	0.00	0.00
Fasteners		Steel	1.00	0.00	0.00	0.00	0.00
Total Weight (Lb)							
Material Cost <sup>1</sup>							
Process Cost							
Order Prod Assn Cost							
Supplier Prod Assn Cost							
SK&A and Profit							
Total Cost <sup>2</sup>							

**Disclaimers**

**This cost analysis utilizes the Quick Cost Estimating method:**

Quick Cost Estimating (QCE) is gaining popularity due to the need for speed driven and accurate results. In response, Munro has developed a proprietary methodology. The goal of QCE is to provide the customer with approximate, rather than technical costs which are much more expensive and time consuming to generate. A QCE's level of accuracy provides customers with the ability to make sound comparisons and directional decisions with confidence.

The QCE process starts with the disassembly of the vehicle and the creation of a bill of materials and a bill of process within Design Profit® Software, which is referred to as a cost map. For each component in the Design Profit® cost map, properties such as material, manufacturing process, complexity, weight, size, etc. are analyzed to determine how it should be costed. The QCE process relies on Munro's expertise, knowledge base, process calculators, and supporting labor, material, and manufacturing & machinery databases. The costs reported for this analysis will include material costs (raw material & purchased parts), process costs (manufacturing and assembly of components), and final assembly costs for the supplier and OEM.

# Twelve Motor Report



## Motor Costed Bill of Material

- ❖ The Costed Bill of Material (CBOM) is a consolidated view of the cost information presented in the reports. A CBOM report is included for each motor analyzed.
- ❖ The bill of material is an indented format and includes:
  - Part name
  - Material
  - Total Cost
  - Weight
  - Quantity
  - Total Weight

Assembly Name								
Symbol Name	Material Name	Supplier Name	Total Cost*	Weight (kg)	Item Qty	Total Cost* (Total)	Weight (kg) (Total)	
Suspension Front Bolt	Commodity Item	-						
Suspension Middle Bolt	Commodity Item	-						
Suspension Front Cradle Bolt close to vehicle Rear	Commodity Item	-						
Suspension Rear Bolt close to vehicle Rear	Commodity Item	-	\$0.29	0.0873	2	\$0.58	0.1346	
M10-1.25x35 Class 10 SHex Extra Big Flange Bolt	Commodity Item	-	\$0.08	0.0244	4	\$0.32	0.0976	
M10-1.5x33 Class 10 SHex Flange Head Bolt	Commodity Item	-	\$0.11	0.0336	4	\$0.44	0.1344	
Brake Line Clip Front Wheel	Commodity Item	-	\$0.06	0.0032	2	\$0.10	0.0064	
Rear Suspension Assembly	Multiple	-	\$423.87	65.4512	1	\$423.87	65.0000	
Rear Cradle Assy with Swaybar	Multiple	-	\$114.71	26.1172	1	\$114.71	26.1000	
Rear Cradle Assy without Swaybar	Multiple	-	\$102.15	23.0000	1	\$102.15	23.0000	
Rear Stabilizer Bar Assembly	Multiple	-	\$11.82	3.0360	1	\$11.82	3.0360	
Bolt Swaybar Brackets to RR Cradle	Commodity Item	-	\$0.06	0.0203	4	\$0.24	0.0812	
Bolt Motor Mount to RR Cradle Assy	Commodity Item	-	\$0.37	0.0974	3	\$1.11	0.2922	
Rear Suspension Assembly LH	Multiple	-	\$149.44	18.8255	1	\$149.44	18.0000	
Rear Knuckle	AI - A356	-	\$45.13	4.6160	1	\$45.13	4.6160	
Rear Lower Track Bar Aft	Multiple	-	\$5.94	0.9460	1	\$5.94	0.9460	
M12-1.75x75 Hex Hd. Shoulder Screw	Commodity Item	-	\$0.31	0.0863	3	\$0.93	0.2589	
M12-1.75 Hex Nut	Commodity Item	-	\$0.06	0.0213	3	\$0.18	0.0639	
Rear LTB-Fox	Multiple	-	\$6.36	0.7960	1	\$6.36	0.7960	
Rear Link Bar	Multiple	-	\$7.87	0.3261	1	\$7.87	0.3261	
M10-1.5 HEX NUT	Commodity Item	-	\$0.06	0.0147	1	\$0.06	0.0147	
Rear UTB-Fox	Multiple	-	\$5.90	0.7460	1	\$5.90	0.7460	
REAR UTB-Aft	Multiple	-	\$6.24	0.9140	1	\$6.24	0.9140	
M14-2 x 95 Hex Hd Bolt	Commodity Item	-	\$0.83	0.1497	3	\$1.89	0.4491	
M14-2 Hex Nut	Commodity Item	-	\$0.10	0.0327	3	\$0.30	0.0981	
Rear Spring Seat Assembly	Multiple	-	\$7.22	3.0387	1	\$7.22	3.0000	
Rear Spring Seat	Steel 1015 - Coil	-	\$5.80	2.7960	1	\$5.80	2.7960	
Rear Spring Seat Cover	PP-GF30	-	\$1.10	0.2300	1	\$1.10	0.2300	
M16x19 Hex Screw/washer, Front Aero Shield	Commodity Item	-	\$0.12	0.0117	1	\$0.12	0.0117	
Rear Shock Assembly	Multiple	Mando	\$28.50	2.8940	1	\$28.50	2.8940	
Rear Coil Spring Assembly	Commodity Item	-	\$14.53	3.7530	1	\$14.53	3.7530	
Rear Spring Bottom Pad	NBR	-	\$1.24	0.1390	1	\$1.24	0.1390	

*Please note the costed bill of material is provided in pictorial / PDF format and will not be available in Excel.*



## FAQ (Frequently Asked Questions)

- ❖ Were the motors' manufacturers involved in the study?  
***No. Neither OEM proprietary costs nor any component supplier's quoted costs were used in this study.***
- ❖ Is there any OEM proprietary (stolen) IP in this report?  
***No. All data was developed through Munro's proven methodologies, analyzing Munro's purchased production Tesla vehicles and OEMs' assemblies***
- ❖ Are the components costed using USMCA costing centers?  
***Yes, Munro includes labor, factory floor cost, taxes and SG&A for OEM or 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 your regional Munro salesperson. They can provide sample information in digital PDF format NOTE: critical data will be hidden in the sample.***
- ❖ Is Purchaser allowed to Reproduce, Distribute, Disseminate, Photocopy, Fax, or Transmit report content internally within the Purchaser's organization?  
***Yes, ONLY INTERNAL Company correspondence is authorized.***  
***NOTE: The purchasing company shall not be legally permitted to reproduce, distribute, disseminate, photocopy, fax, transmit, sell, publish, or send this material, or any portion thereof, by any means without the express written permission of Munro & Associates Inc. under penalty of law. The reports are Copyright Protected.***
- ❖ If questions arise, is a Munro expert able to visit and explain the report's details?  
***It is not included in the price of report.***  
***Munro will visit if the customer pays for the travel and a daily fee.***
- ❖ If there are limited specific questions on the content of report, is it possible for a Munro representative to support phone or e-mail communication?  
***Yes, please contact the local area salesperson and we will respond with our answers.***