Motor Cost and Benchmarking Report

$25,000 USD

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

Purchasers of this report will receive a 302 page benchmark report for seven motors at a cost of $25,000 US dollars compared to an estimated value of $170,000 if purchased individually.

A. Top level side by side comparisons
B. Detailed section for each motor with I-PACE motor teaser
C. Motor technical cost analysis
D. Appendix with additional motor information
Four of the motors analyzed made it into the top six receiving recognition in Engine and Powertrain Technology International Magazine engine & powertrain of the year awards!

### Best Electric Powertrain

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WINNER</strong> - Jaguar Land Rover full-electric powertrain</td>
<td>367</td>
</tr>
<tr>
<td>(Jaguar I-Pace)</td>
<td></td>
</tr>
<tr>
<td>Tesla full-electric powertrain</td>
<td>303</td>
</tr>
<tr>
<td>(Tesla Model S, Model X, Model 3)</td>
<td></td>
</tr>
<tr>
<td>BMW full-electric powertrain</td>
<td>172</td>
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<tr>
<td>(BMW i3, i3S)</td>
<td></td>
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<tr>
<td>Hyundai-Kia full-electric powertrain</td>
<td>148</td>
</tr>
<tr>
<td>(Hyundai Kona, Kia Soul EV)</td>
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</tr>
<tr>
<td>Renault / Nissan full-electric powertrain</td>
<td>126</td>
</tr>
<tr>
<td>(Nissan Leaf)</td>
<td></td>
</tr>
<tr>
<td>General Motors full-electric powertrain</td>
<td>89</td>
</tr>
<tr>
<td>(Chevrolet Bolt, Opel Ampera-e)</td>
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</tbody>
</table>
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:
   - Over all dimensions and weights
   - Discreet part dimensions i.e. 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.
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 broke up 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 in regards to 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.”
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

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 Manufacturers involved in the study?
  
  _No, OEM proprietary costs nor any suppliers quoted costs were used in this study._

- Is there any OEM propriety (stolen) IP in this report?
  
  _No. All data was developed through Munro’s proven methodologies from the purchased production components._

- Is the car costed using only NAFTA 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 sales person. They can provide sample information in digital PDF format NOTE: critical data will be hidden in the sample._

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  _Internal Company correspondence is authorized._

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- If there is a request for someone from Munro to visit and to explain in detail the report, is it possible to do or is it included in the price of report?
  
  _No, it is not included in the price of report._

  _Munro will visit if the customer pays for the travel and daily fee._

- If there are a few but specific questions on the content of report, is it possible to support a phone or e-mail communication?
  
  _Yes, please contact the local area sales person and we will respond with our answers._