

Figure 50: Chevy Bolt powertrain modules

Component	Price today (\$)	Price 2025E (\$)	Change %	Function
Li-ion battery pack	11,500-12,522	8,000	-30-36%	Entire battery pack including housing, thermal control, internal wiring, emergency switch and battery management system
<i>Li-ion battery cell</i>	<i>8,700</i>	<i>5,400</i>	<i>-31%</i>	<i>Stores up to 60kWh of electric power, \$145/kWh</i>
<i>Battery management system (BMS)</i>	<i>150-222</i>	<i>200</i>	<i>up to -10%</i>	<i>Monitors the voltage output of each cell group and temperature of the pack</i>
<i>Battery thermal management</i>	<i>100</i>	<i>90</i>	<i>-10%</i>	<i>Heats and cools battery in order to keep operating temperature within desired range; glycol/water based</i>
<i>All other pack content</i>	<i>2,550-3,500</i>	<i>2,310</i>	<i>-9-34%</i>	<i>Module frames, internal wiring, cooling plates, steel pack case, plastics cover, emergency switch, safety relays, pack assembly</i>
Thermal management	250	225	-10%	Controls temperature of electronics and cabin via liquid-based cooling/heating loops
Power distribution module (PDM)	250-328	295	up to -10%	Takes in DC from battery or charging system and distributes it to the inverter, DC/DC converter and electric heating system
Inverter / converter	697-700	523	-25%	Takes in DC from the PDM and converts it to 3-phase AC for the e-motor
Electric drive module	1,200-1,550	1,080	-10-30%	150kW permanent-magnet e-motor takes in AC from the inverter to turn a drive shaft via magnetic power; a single-speed gearbox is used to translate rotational speed down to final drive ratio
DC/DC converter	150-179	134	-11-25%	Takes in 360V DC from PDM and converts to 12V DC for low-power systems in the vehicle
Electric Vehicle Communication Controller (EVCC)	51	46	-10%	Supports communication between the vehicle and charger for fast charging
Vehicle Interface Control Module (VICM)	93-100	84	-10%	Functions like a data storage and distribution centre, controlling and monitoring operations between inter-reporting modules; maintains diagnostic information related to the electric propulsion system
High voltage cables	335	302	-10%	Connects the various electronics modules, the e-motor and the battery
On-board charger	273-598	205	-25-66%	Charges the battery pack by converting AC from the charging cord to DC. High end of range represents fast charging (paid option in our Bolt vehicle)
Charging cord	150	135	-10%	Allows the customer to charge the car using a standard 120V AC outlet. Rated to withstand 10,000 mating cycles. With 1 mating cycle per day, the theoretical lifespan is approx. 27.4 years
Total	14,949-16,763	10,416	-30-38%	

Source: UBS estimates. Note: Estimates highlighted in blue are Munro estimates, which we use as basis for further modelling purposes in this report

- **Innovation and economies of scale at supplier level:** Lower costs for the battery and for other EV powertrain components (\$5.5k);
- **Economies of scale at OEM level:** Lower unit costs through mass production and better R&D and overhead coverage (\$7.7k).

Figure 76: Detailed Chevrolet Bolt profitability analysis (\$)

	Today		2025E		Commentary
Battery cost (\$, total)	12,300	12,300	7,800	7,800	
Battery cost (\$ / kWh)	205	205	130	130	
Cell	145	145	90	90	Based on GM disclosure and UBS cost forecast Previous UBS estimate for 2016: ~\$100/kWh
Pack*	60	60	40	40	
	w/ options	Base w/ options	Base		
MSRP	42,635	36,620	42,635	36,620	Future Bolt MSRP likely lower; kept stable only for this exercise
Dealer/incentive (15%)	5,561	4,777	5,561	4,777	
Price charged by OEM	37,074	31,843	37,074	31,843	
Direct powertrain costs	16,403	16,078	11,272	10,028	\$4.6k or 26% below our previous estimate
Battery cell	8,700	8,700	5,400	5,400	
Battery pack*	3,600	3,600	2,400	2,400	Pack cost based on teardown analysis
BMS	222	222	200	200	
Thermal management	250	250	225	225	Cost reduction of 10-25% per component on a 2025 view driven by scale, technology improvements and competition
Inverter	697	697	523	523	
DC/DC Converter	179	179	134	134	
Power distribution module	328	328	295	295	
High-voltage cables	335	335	302	302	
Electric drive module	1,200	1,200	1,080	1,080	
VCIM & EVCC**	144	144	130	130	
Onboard charger	598	273	449	205	
Charging cord	150	150	135	135	
Other direct costs	15,608	12,600	14,908	11,900	
Warranty provision	700	700	500	500	
Direct assembly staff cost	2,400	2,400	2,400	2,400	Based on average OEM factory assembly staff costs
Direct materials (assembly)	1,500	1,500	1,500	1,500	Primarily body and chassis
Supplier components	8,000	8,000	7,500	7,500	Includes interior, safety, ADAS & other electronics, etc.
Costs of optional features	3,008	0	3,008	0	Assume OEM generates 50% gross margin on options
Contribution margin	5,063	3,165	11,895	8,916	
% margin	14%	10%	29%	28%	
D&A	1,929	1,929	952	952	D&A cost degression driven by higher unit sales
R&D	7,143	7,143	714	714	R&D cost degression driven by higher unit sales
SG&A	1,512	1,512	1,512	1,512	Assume company-wide average SG&A / car for GM
D&A % of sales	5%	6%	3%	3%	
R&D % of sales	19%	22%	2%	2%	
SG&A % of sales	4%	5%	4%	5%	
EBIT	-5,520	-7,418	7,716	5,737	
EBIT margin	-15%	-23%	21%	18%	Assumed Bolt sticker price stays constant

Source: UBS

* ex BMS (Battery management system)

** VCIM = Vehicle interface control module; EVCC = Electric vehicle communication controller

We note that the estimated loss of \$7.4k on the base model is lower than GM's guidance. The company talked about an initial EBIT loss of ~\$9k per vehicle. Hence, there is a difference of \$1.6k or 4% of the total costs of the Bolt between