

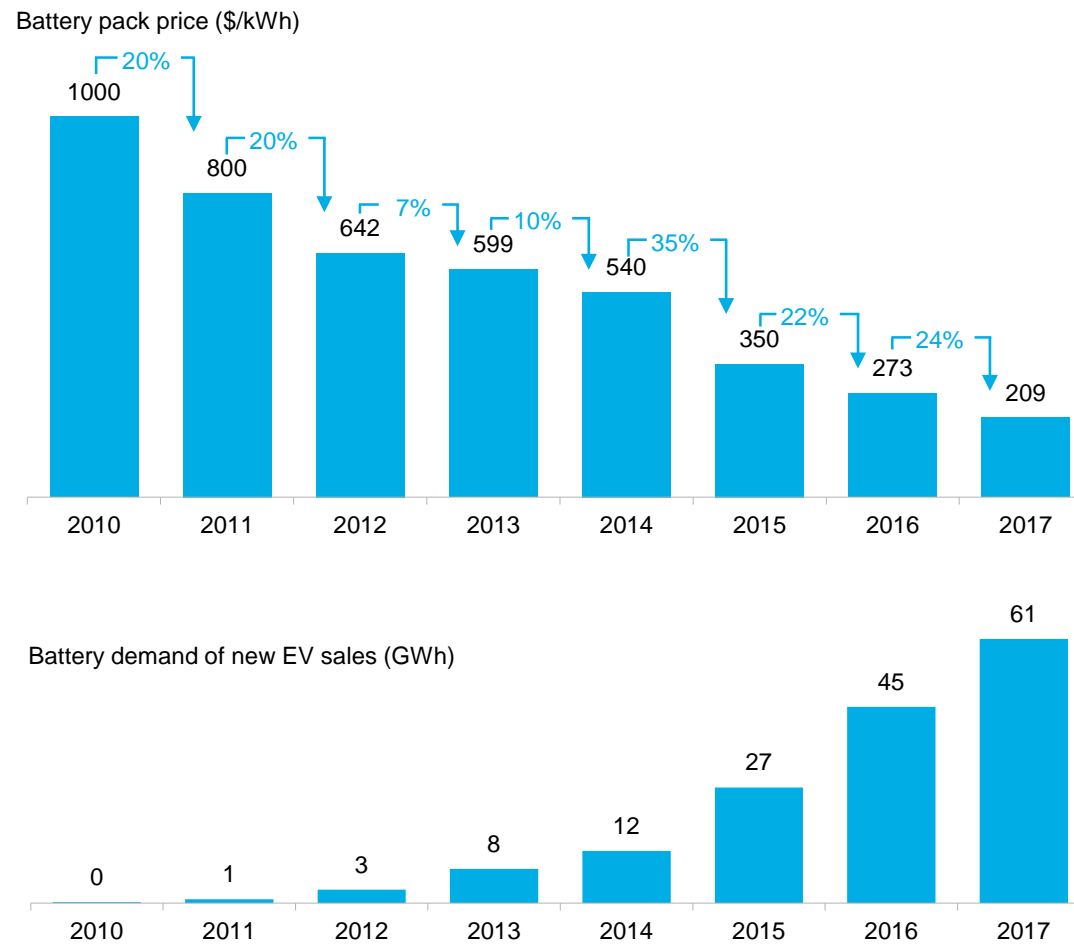
Cost projections

Batteries, vehicles and TCO

Nikolas Soulopoulos

June 14, 2018

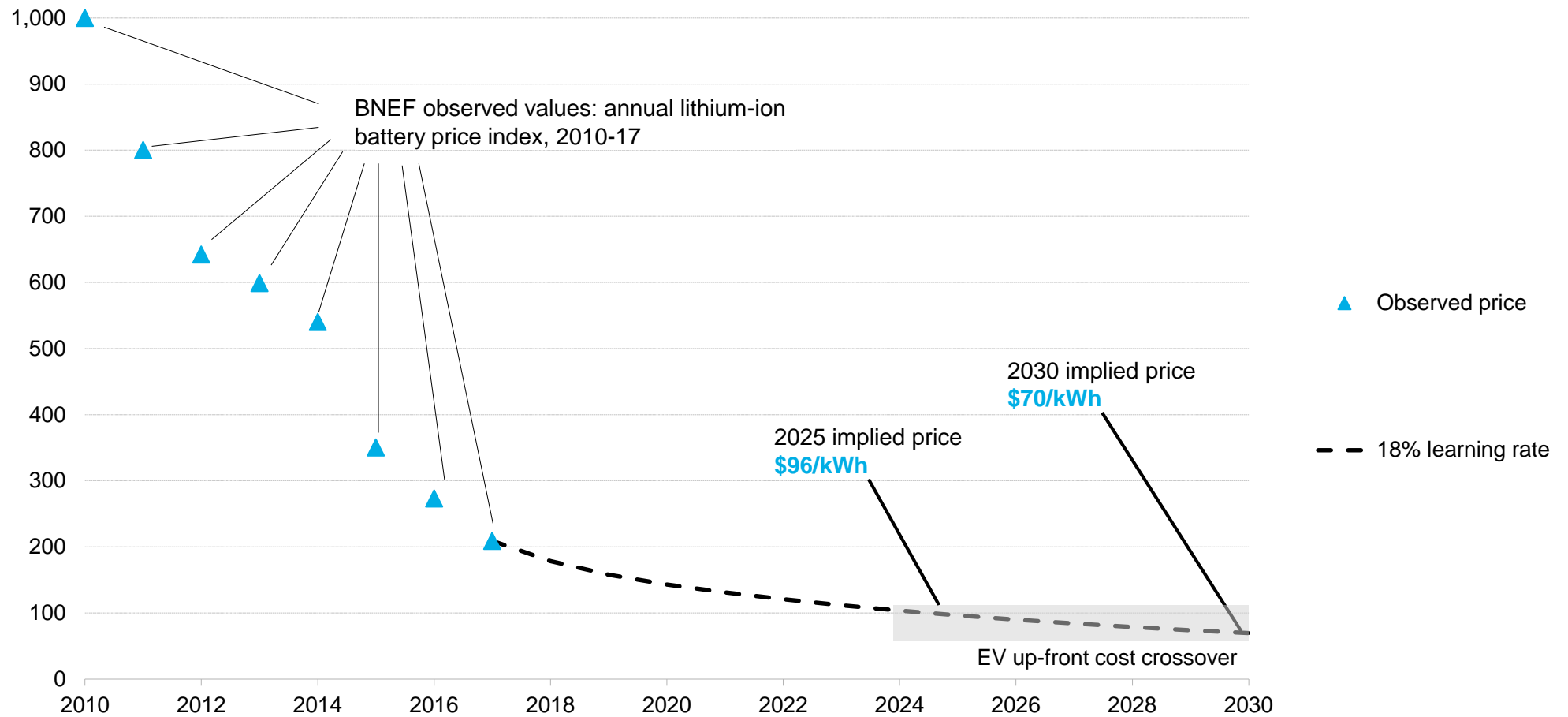
EV sales are supporting technology cost declines



Source: Bloomberg New Energy Finance

Technology consolidation + demand growth = lower battery prices

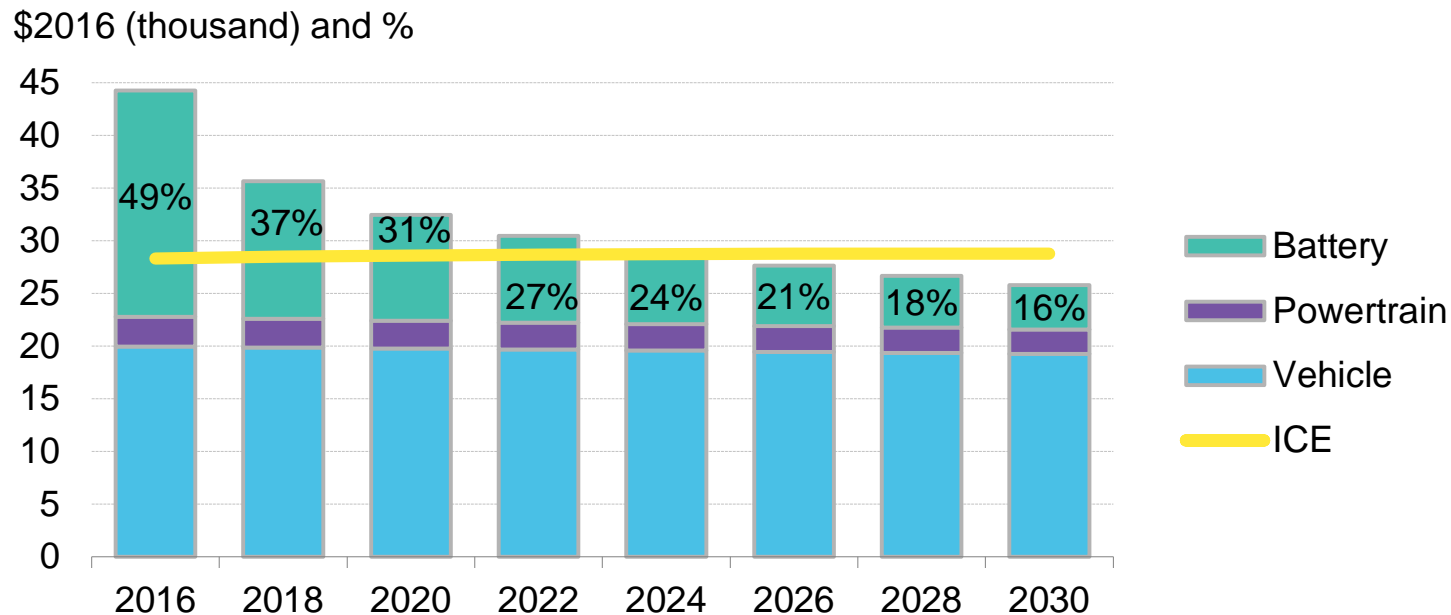
Lithium-ion battery pack price (\$/kWh)



Source: Bloomberg New Energy Finance

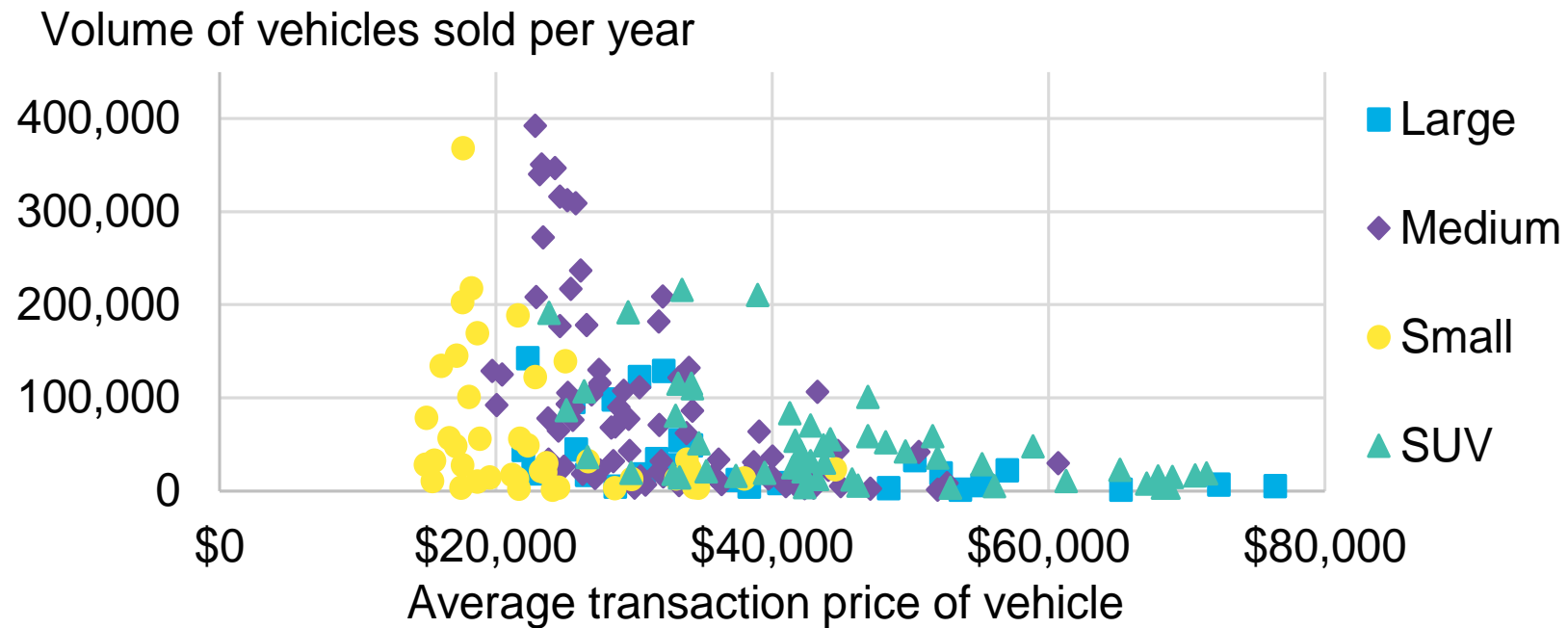
The contribution of the battery on total manufacturing costs will drop rapidly

estimated pre-tax retail prices for medium-size BEVs in the U.S.



Source: Bloomberg New Energy Finance, EPA, NHTSA, IDL, FEV Note: Shows estimated pre-tax retail prices

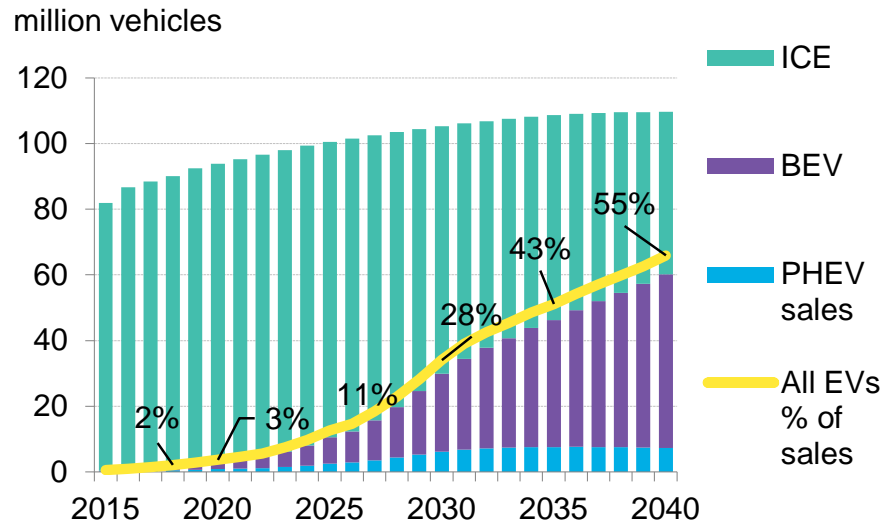
U.S. car market segmentation and average retail price



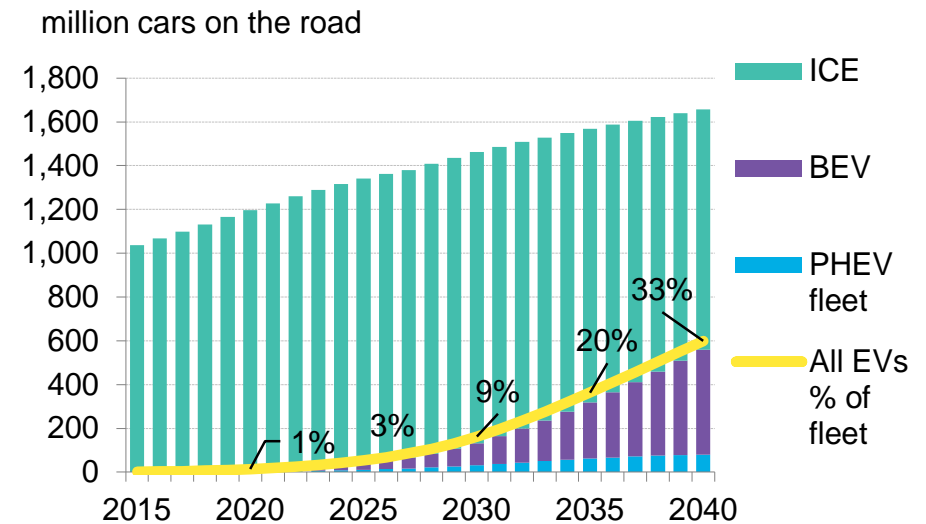
Source: Bloomberg New Energy Finance Note: 2016/17 data.

Falling capital costs and better economics will lead to large-scale EV adoption

Annual global light duty vehicle sales



Global light duty vehicle fleet



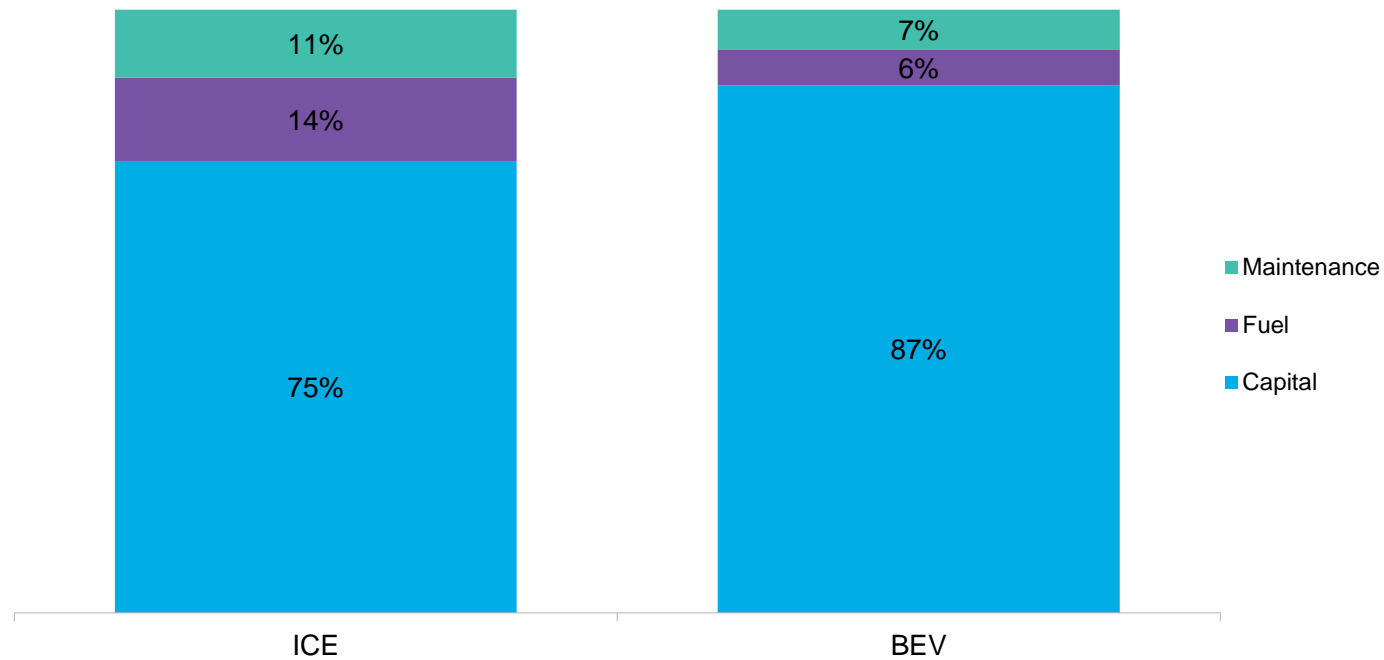
Source: Bloomberg New Energy Finance

Source: Bloomberg New Energy Finance

TCO breakdown

private medium-size passenger vehicles in the U.S.

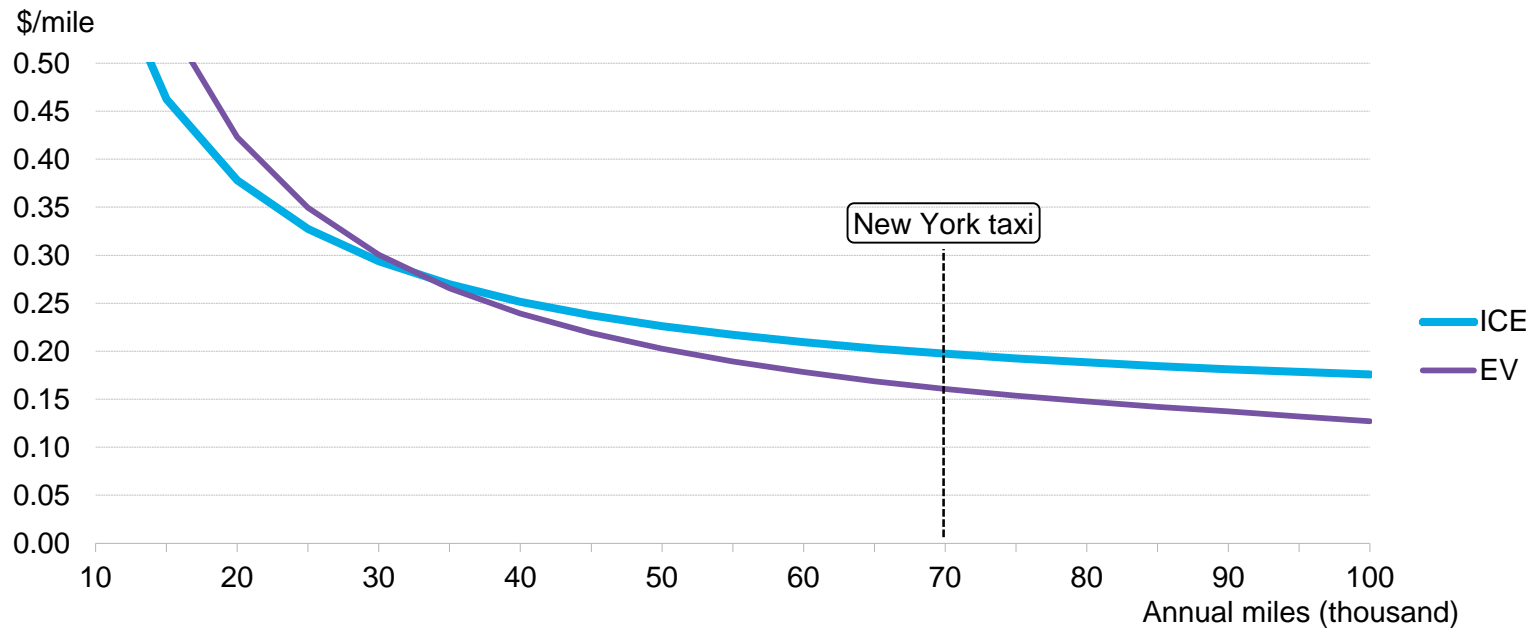
Share of total costs, 2018



Source: Bloomberg New Energy Finance

With high utilization, parity hits sooner and lower

medium-size passenger vehicles in the U.S.



Source: Bloomberg New Energy Finance Note: An ICE costs \$25,000 and a BEV costs \$35,850; gasoline price is \$2.3/gallon and electricity price is \$0.12/kWh; Total Cost of Ownership includes capital costs, fuel costs and maintenance

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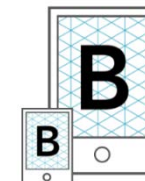
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