

# The global EV market: where to next?

**EVS30**

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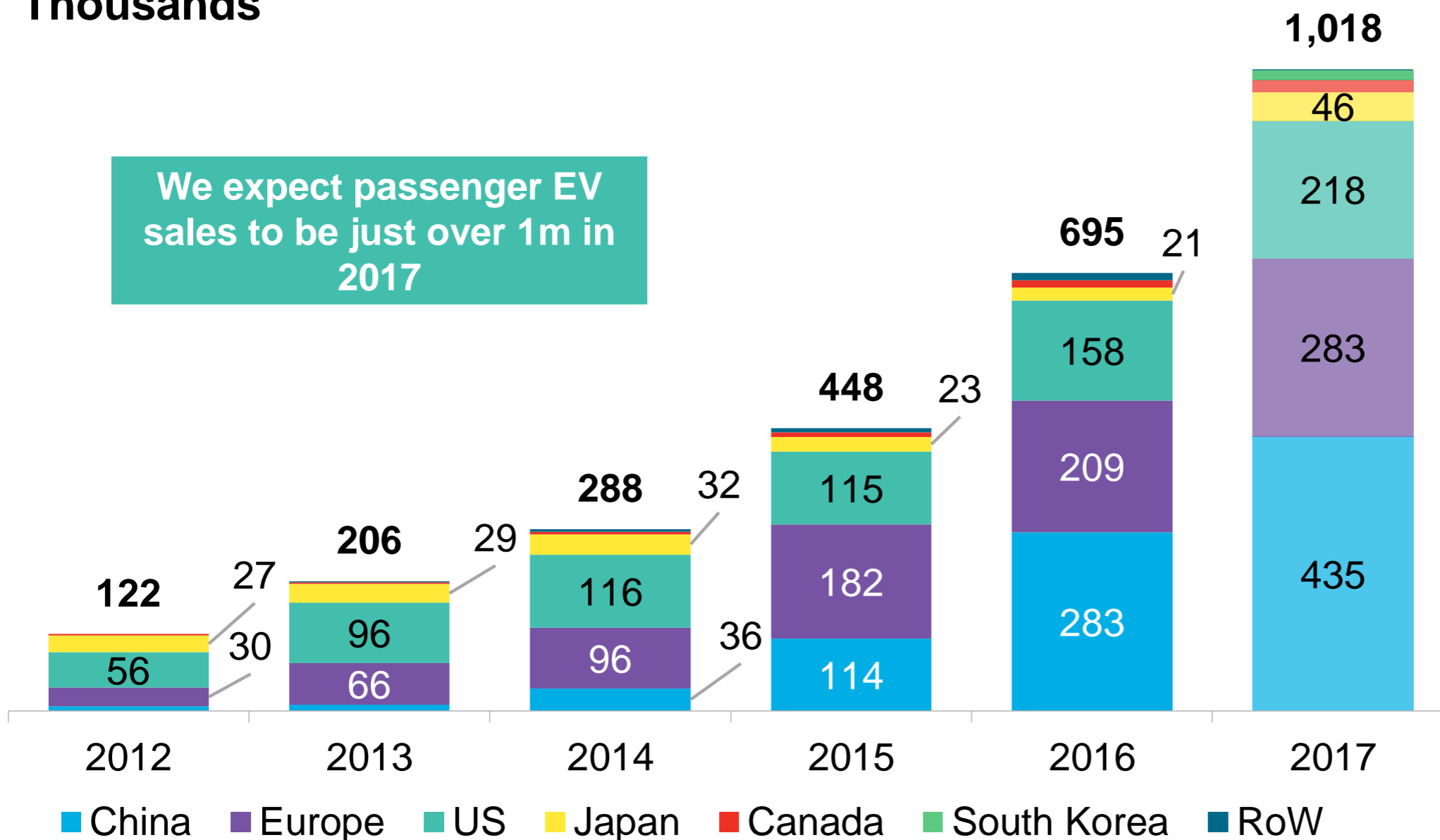
October 9th, 2017

**Bloomberg**  
**New Energy Finance**

# Global EV sales by region

Thousands

We expect passenger EV sales to be just over 1m in 2017



Source: Bloomberg New Energy Finance, Marklines, automakers, vehicle registration agencies Note: EV sales include BEV and PHEV sales. China data exclude low-speed EV sales and commercial vehicles.

# Countries where EVs were above 1% of total passenger vehicle sales

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Year

Country

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2014



# Countries where EVs were above 1% of total passenger vehicle sales

Year

Country




2014







2015



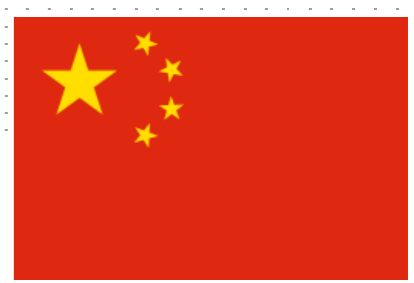
# Countries where EVs were above 1% of total passenger vehicle sales

Year	Country
2014	
2015	
2016	

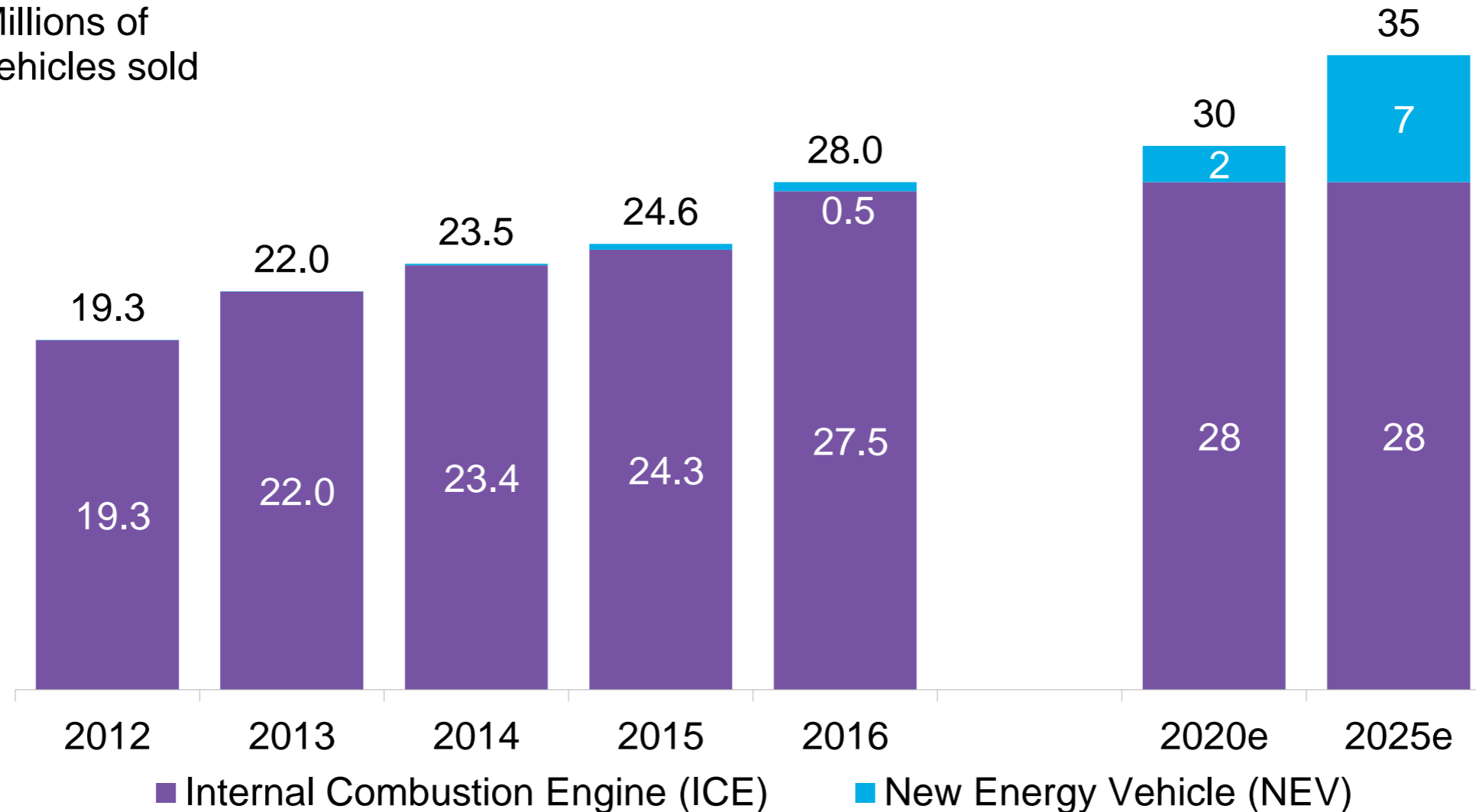
# Countries where EVs were above 1% of total passenger vehicle sales

Year	Country
2014	
2015	
2016	
2017 YTD	

# China's vehicle sales target according to the recent 2025 plan

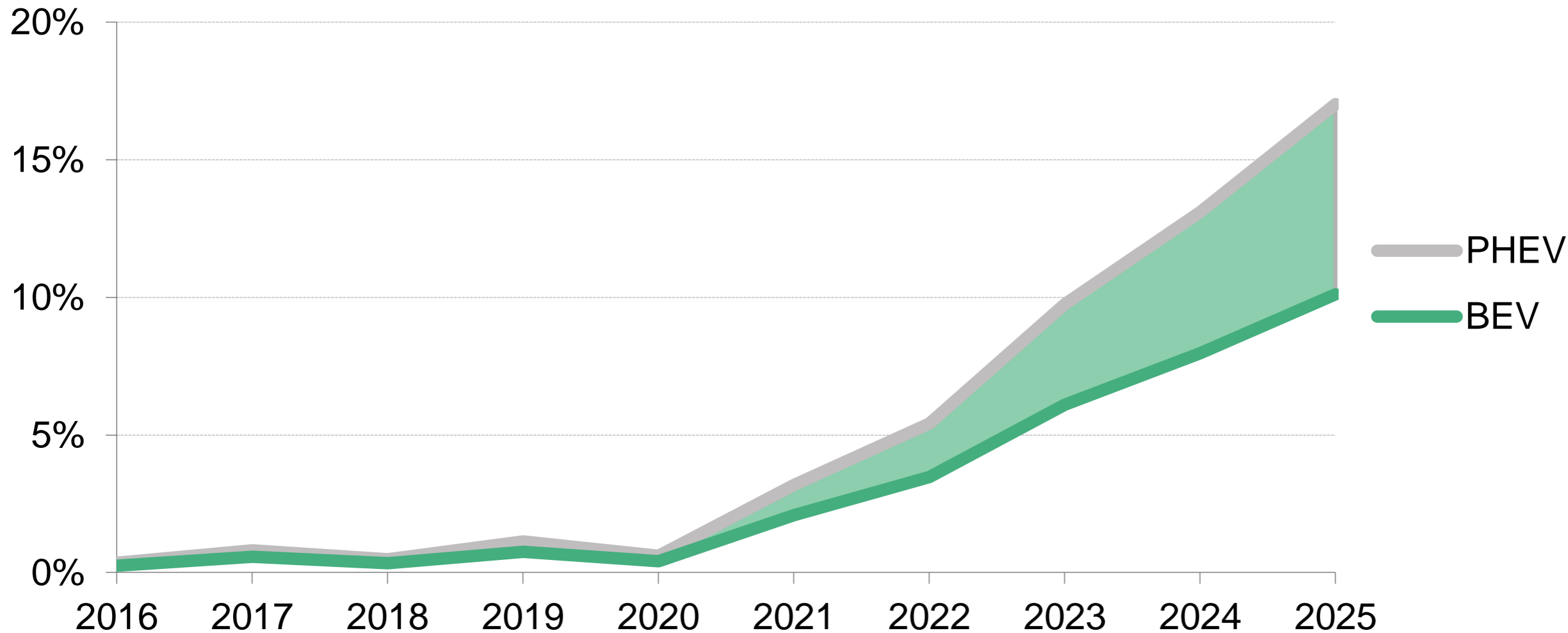


Millions of vehicles sold



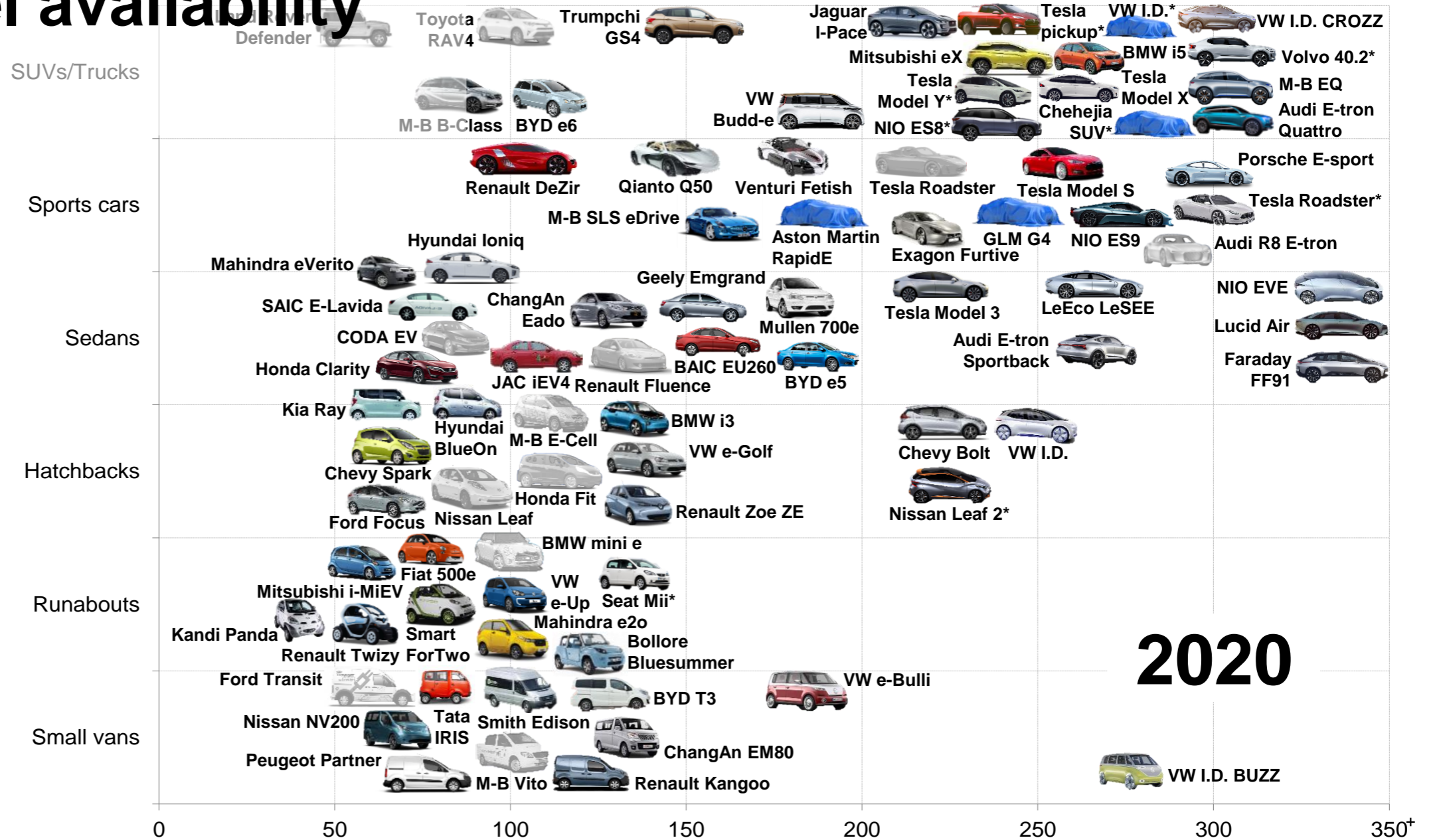
Source: China Automotive Information Net, Bloomberg New Energy Finance

# Share of electric vehicles needed to meet EU CO<sub>2</sub> emission targets – Based on a 78 gCO<sub>2</sub>/km target in 2025



Source: Bloomberg New Energy Finance.

# BEV model availability 2008-20

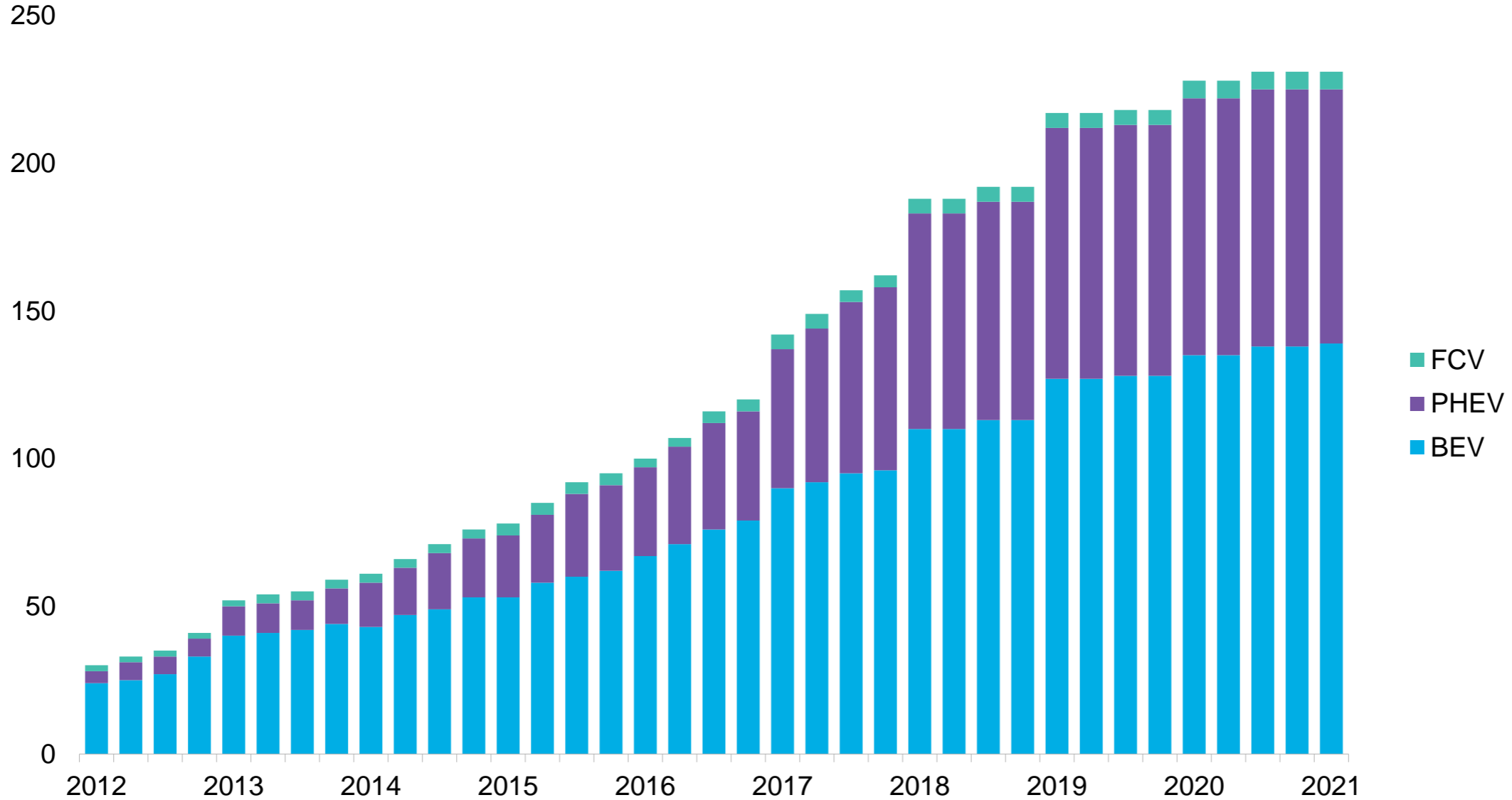


2020

Source: Bloomberg New Energy Finance, respective companies  
Notes: Not exhaustive. (\*) Range is speculated.

# Electric vehicle model availability

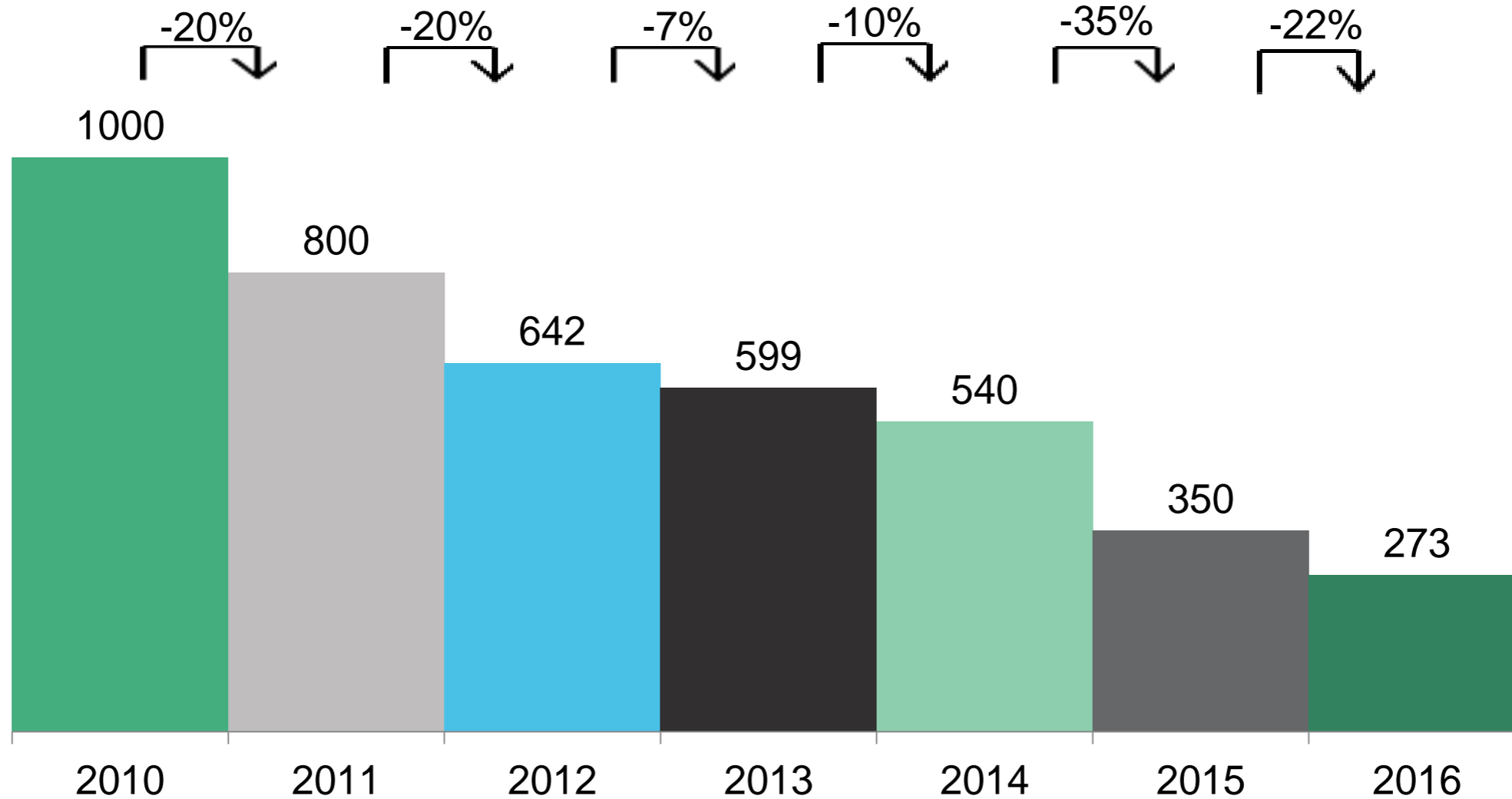
## Number of EV models globally



Source: Bloomberg New Energy Finance

# BNEF 2016 battery pack price survey results

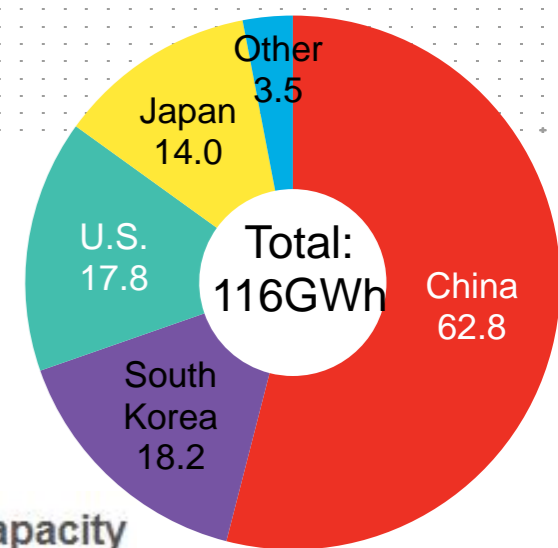
\$ per kWh



Source: Bloomberg New Energy Finance Note: This includes cells plus pack prices and is an average of BEV and PHEV prices. For years where there were two surveys, the data in this chart is an average for the year.

# Global EV lithium-ion battery manufacturing capacity

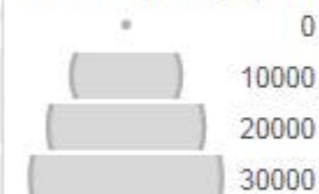
2017 commissioned capacity: **116 GWh**



Total Capacity

116,327 MWh

Plant Capacity (MWh)



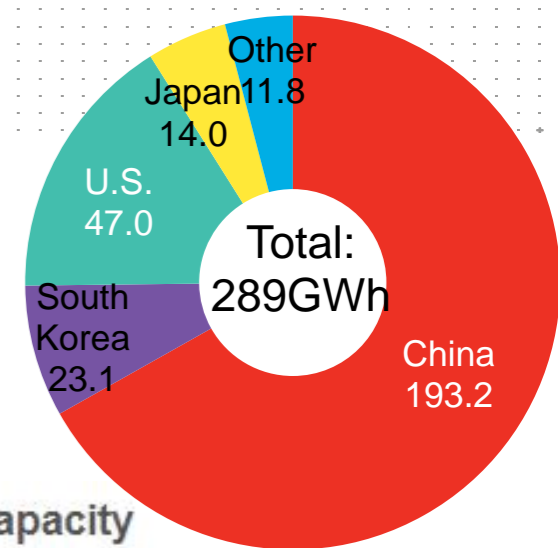
Status

■ Fully commissioned



# Global EV lithium-ion battery manufacturing capacity

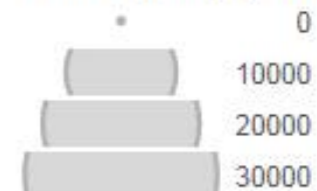
2021 planned capacity: **289 GWh**



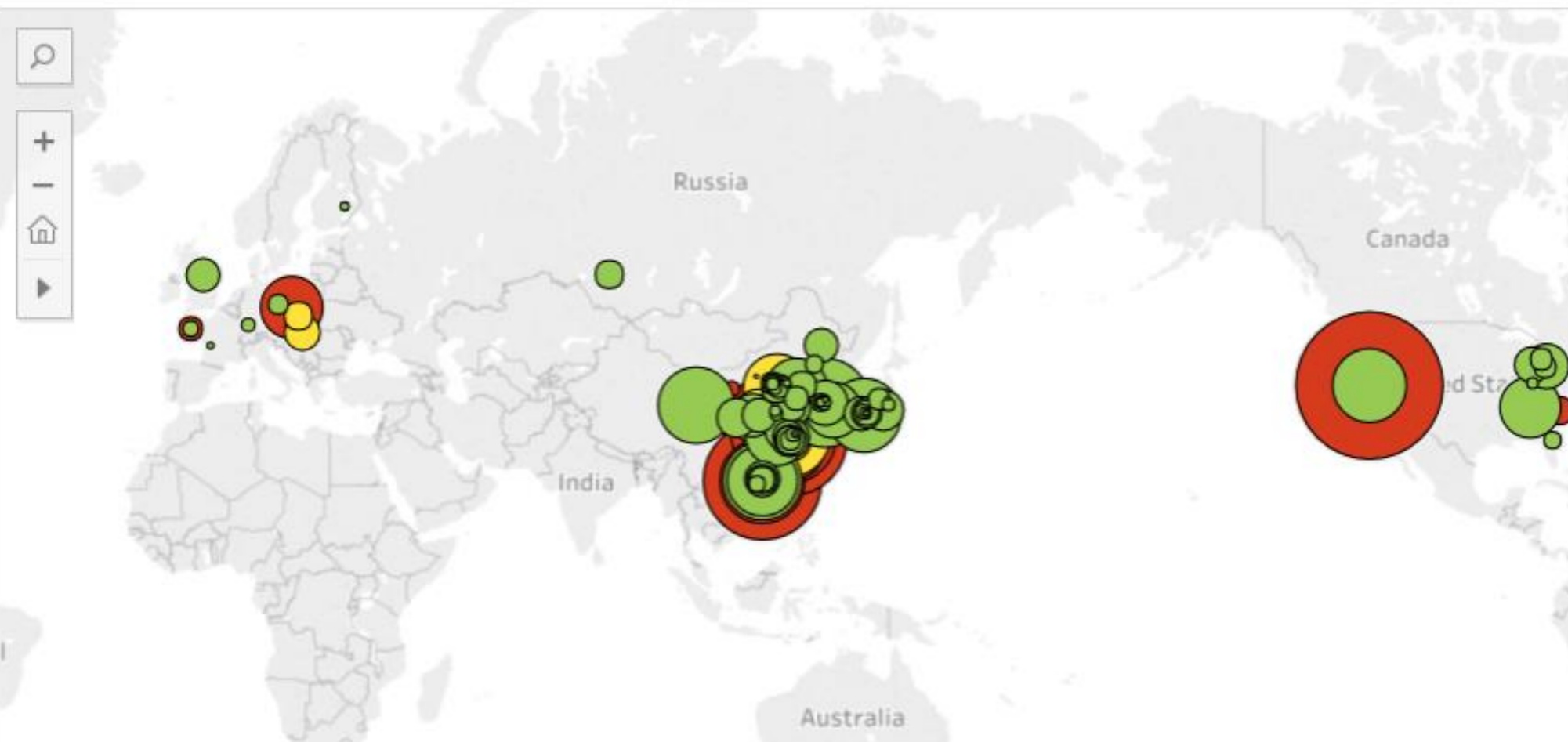
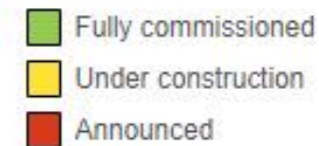
Total Capacity

289,097 MWh

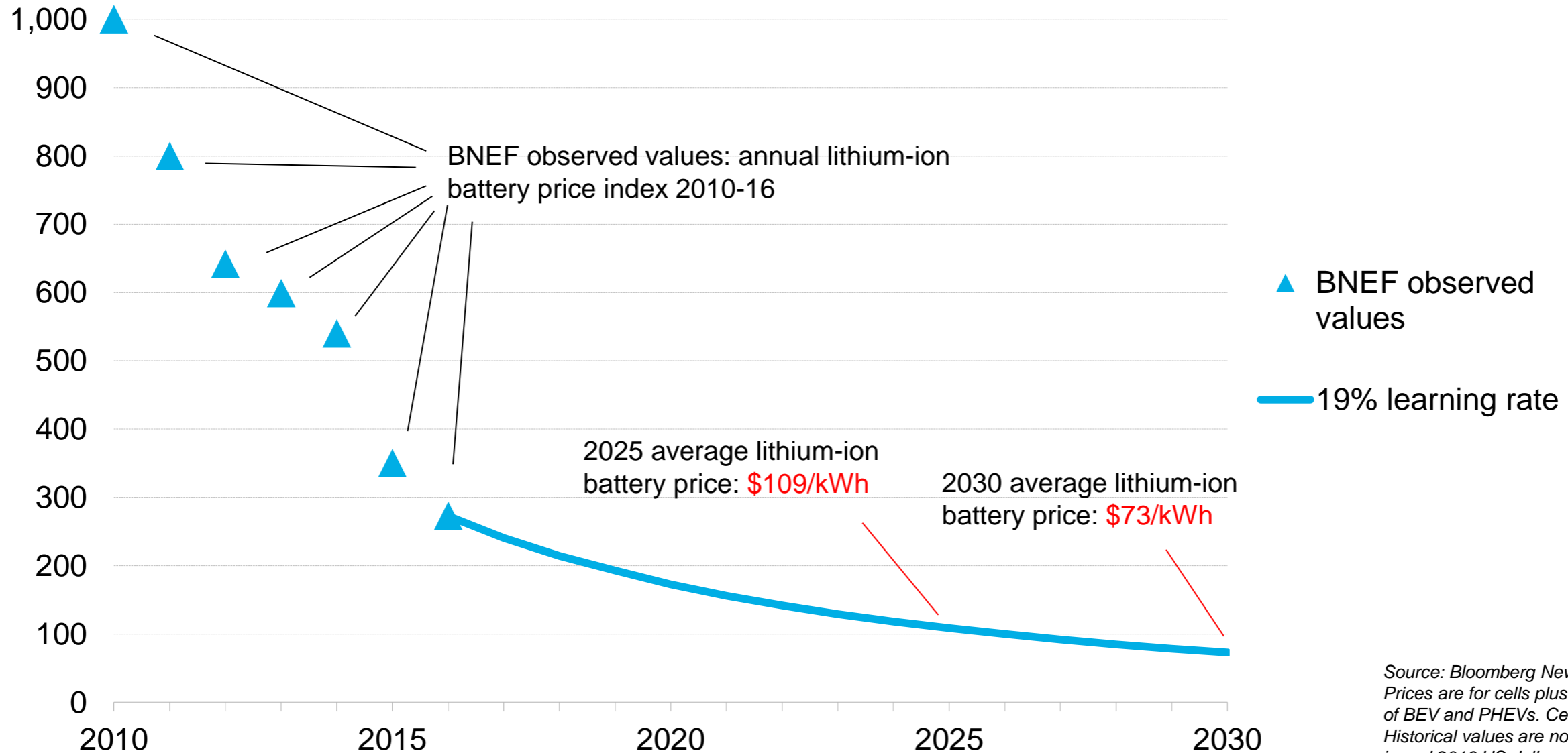
Plant Capacity (MWh)



Status



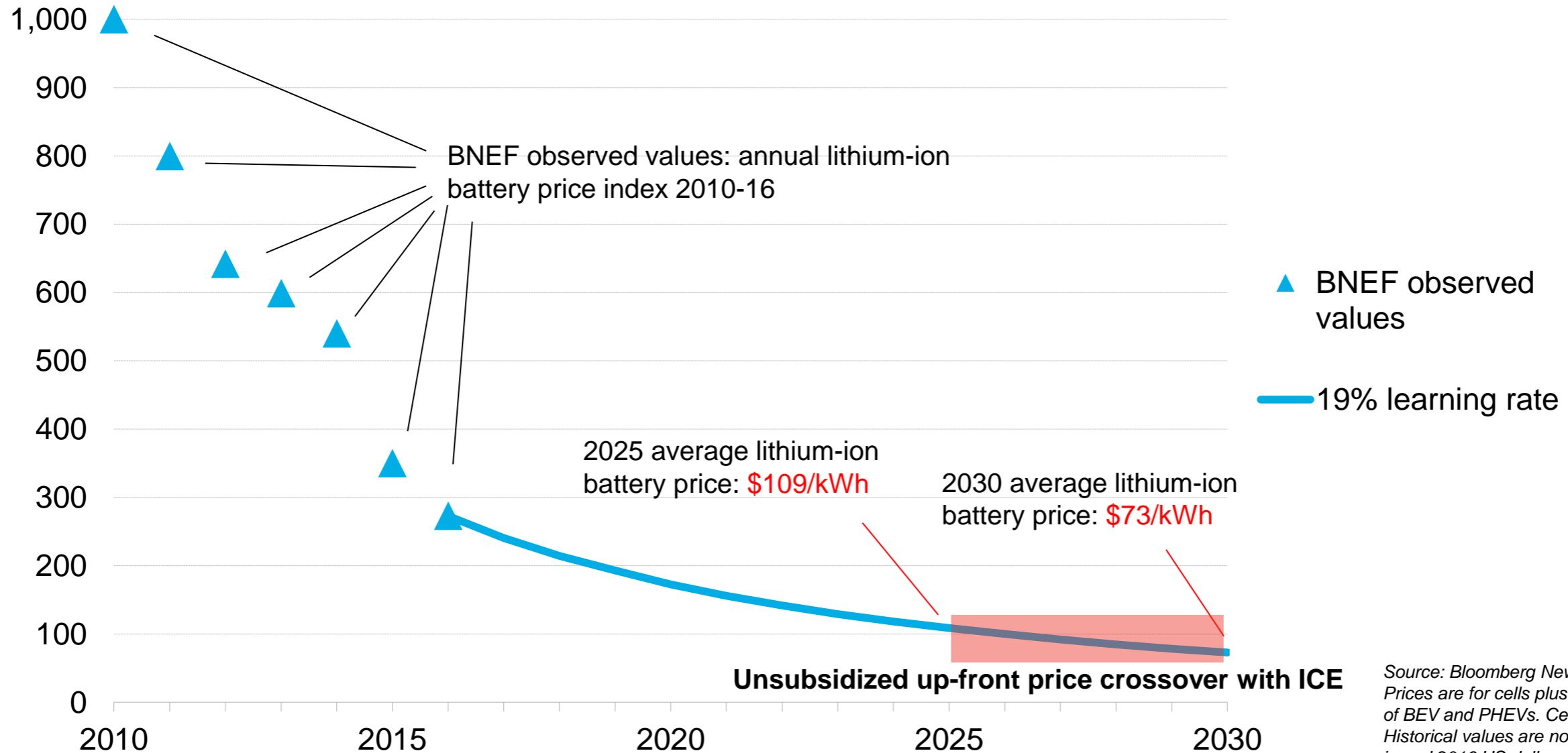
# Lithium-ion battery prices, historical and forecast \$/kWh



Source: Bloomberg New Energy Finance. Note: Prices are for cells plus packs and are an average of BEV and PHEVs. Cell-only prices will be lower. Historical values are nominal, forecast values are in real 2016 US dollars.

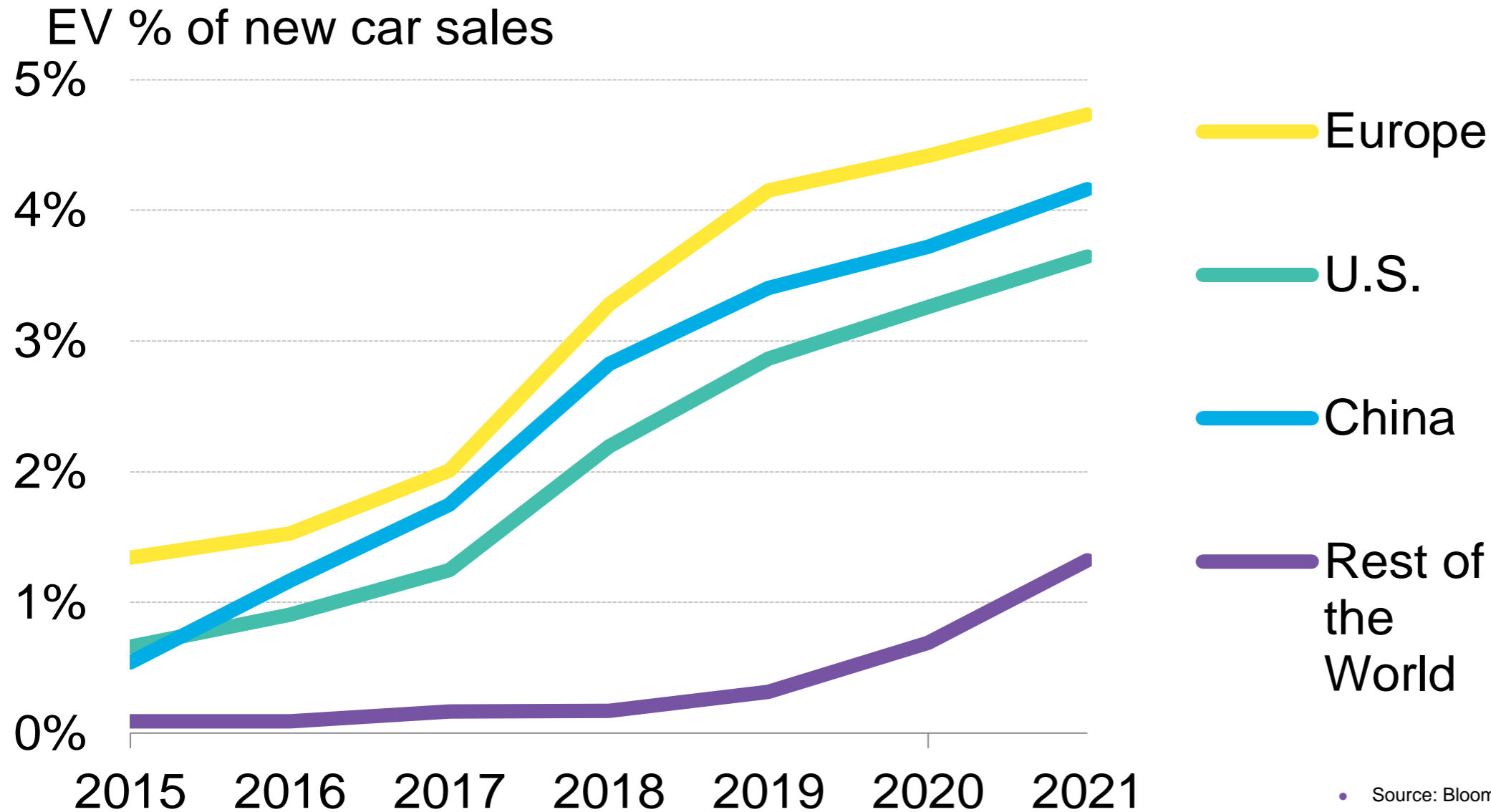
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\$/kWh



Source: Bloomberg New Energy Finance. Note: Prices are for cells plus packs and are an average of BEV and PHEVs. Cell-only prices will be lower. Historical values are nominal, forecast values are in real 2016 US dollars.

# EV penetration rate forecast – short term

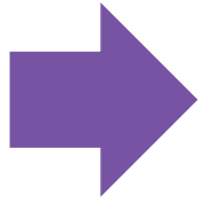


# Will we run out of lithium?



BNEF 2030  
EV adoption  
forecast:

24% of  
global sales



## BNEF 2030 EV adoption forecast

Material	As a % of 2016 total global production
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Lithium	296%
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Lithium	296%
---------	------

Nickel	15%
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--------	-----

Cobalt	127%
--------	------

Cobalt	127%
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Manganese	0.8%
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Graphite	71%
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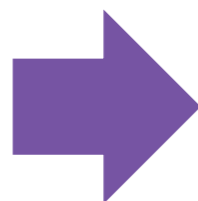
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Source: Bloomberg New Energy Finance, USGS

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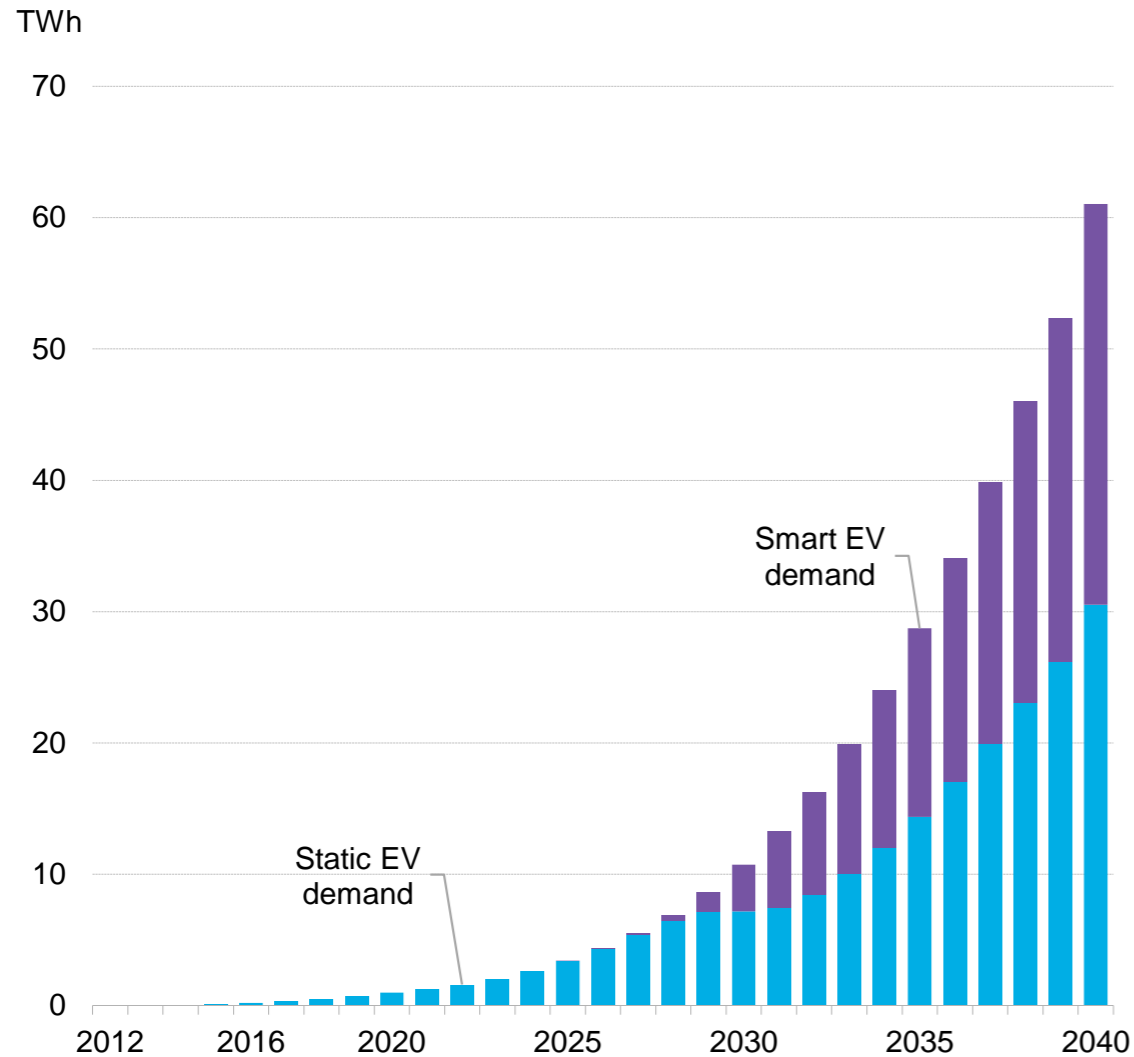
## BNEF 2030 EV adoption forecast

Material	As a % of 2016 total global production	As a % of known global reserves
Lithium	296%	0.74%
Nickel	15%	0.42%
Cobalt	127%	2.23%
Manganese	0.8%	0.02%
Graphite	71%	0.34%

Source: Bloomberg New Energy Finance, USGS

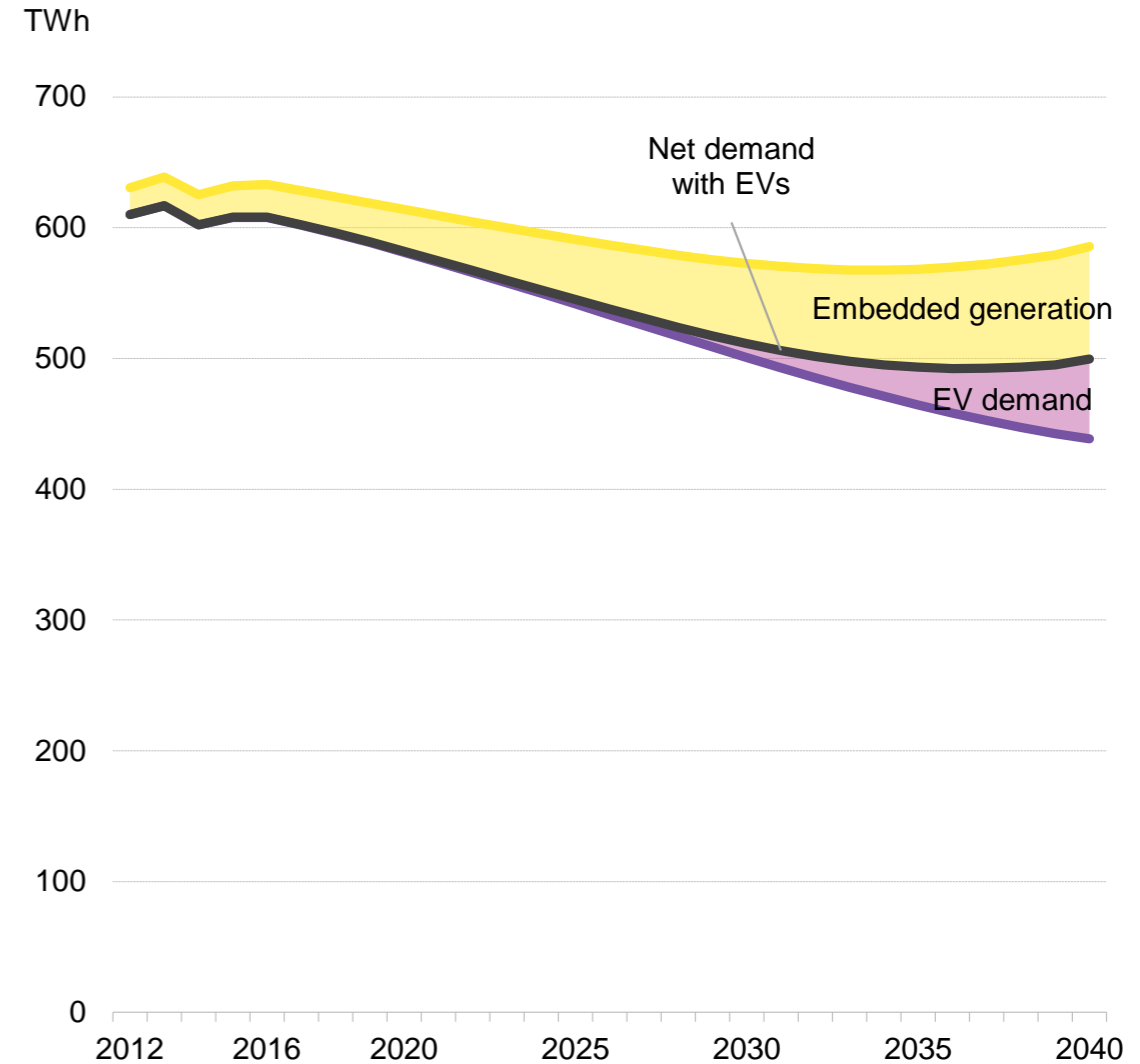
# Can the power system handle it?

## BNEF forecast EV electricity demand - Germany



Source: Bloomberg New Energy Finance

## BNEF forecast total electricity demand - Germany



Source: Bloomberg New Energy Finance

# U.S. states with utilities offering EV-specific charging tariffs



Selected utilities



- U.S. EV home charging tariffs
  - 27 utilities and counting
  - Wide range of rates
  - Many are pilots
- Separate from regular Time of Use rates.
- Smart metering as enabler
- Other countries following: UK, Spain, Portugal, Australia

Source: Bloomberg New Energy Finance. Respective companies. Data current as of September 1, 2017. Utilities in Hawaii and Alaska also have EV-specific TOU trial rates but are not shown.

# What could derail global EV sales growth?



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Area	Likelihood	Impact
Slowdown in lithium-ion battery price declines	Low	High

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Acute shortage of charging infrastructure	Medium	Medium
Big policy changes in the EU, US or China	Medium	High

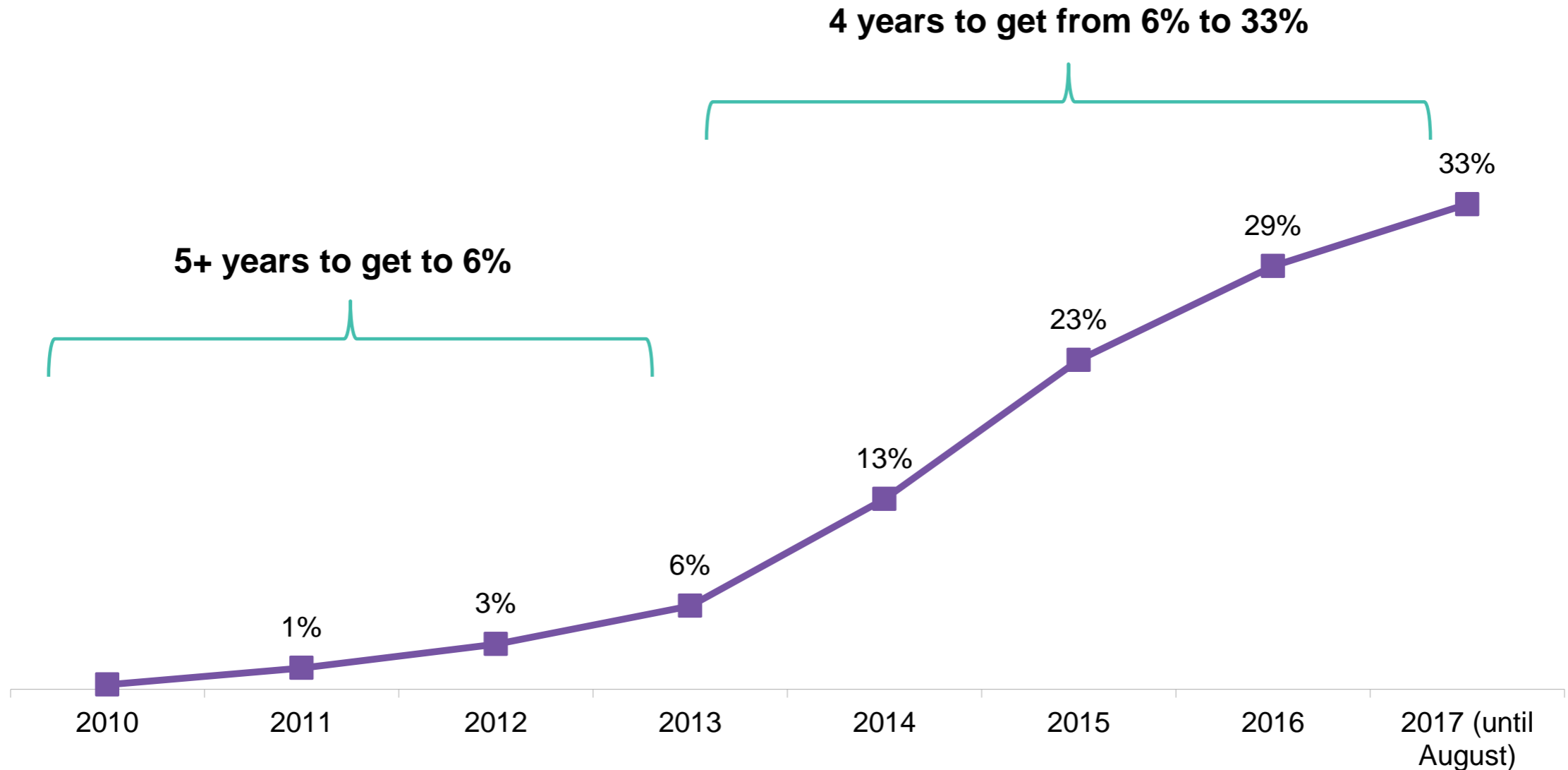
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Slowdown in lithium-ion battery price declines	Low	High
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Oil prices fall further	Medium	Low
Acute shortage of charging infrastructure	Medium	Medium
Big policy changes in the EU, US or China	Medium	High
Mass market interest falls flat	Medium	High

# Lessons from Norway?

## Norway % EV penetration in total new car sales



# Thank you!

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