

Energy storage: technology, application and business

Renewable Energy India Expo, 2017

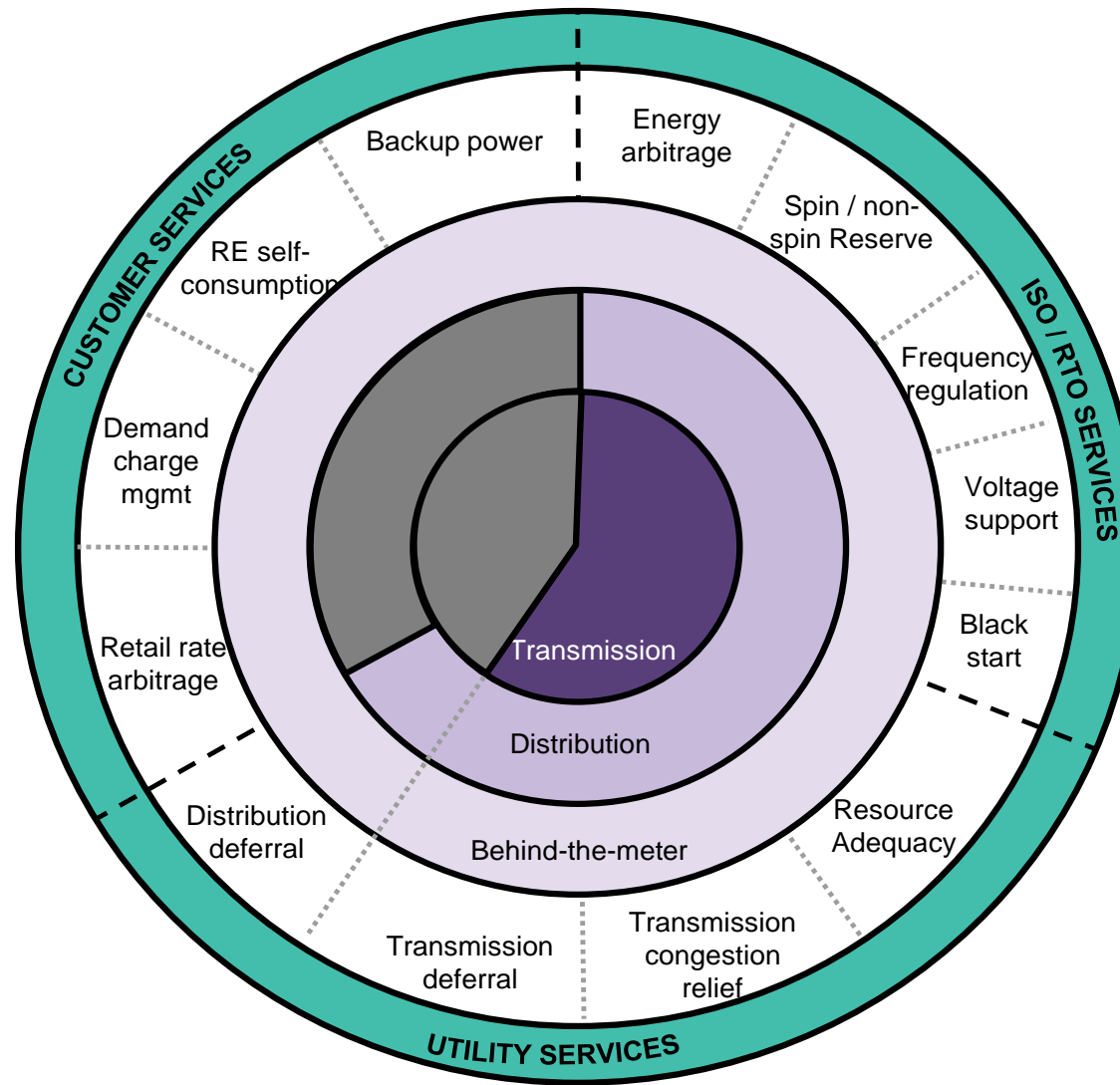
Shantanu Jaiswal

September 21, 2017



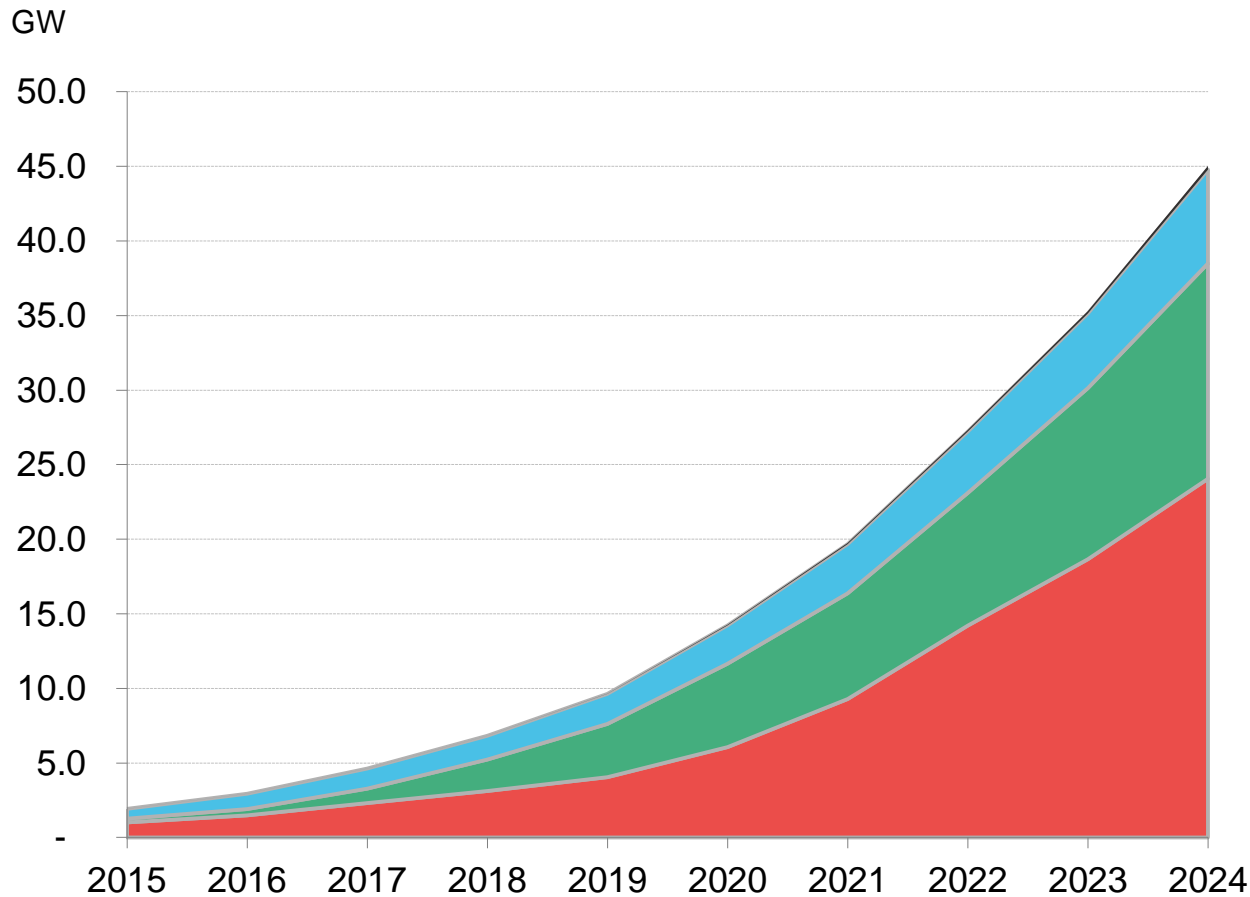
Bloomberg
New Energy Finance

Energy storage application mix



Source: Rocky Mountain institute, Bloomberg New Energy Finance

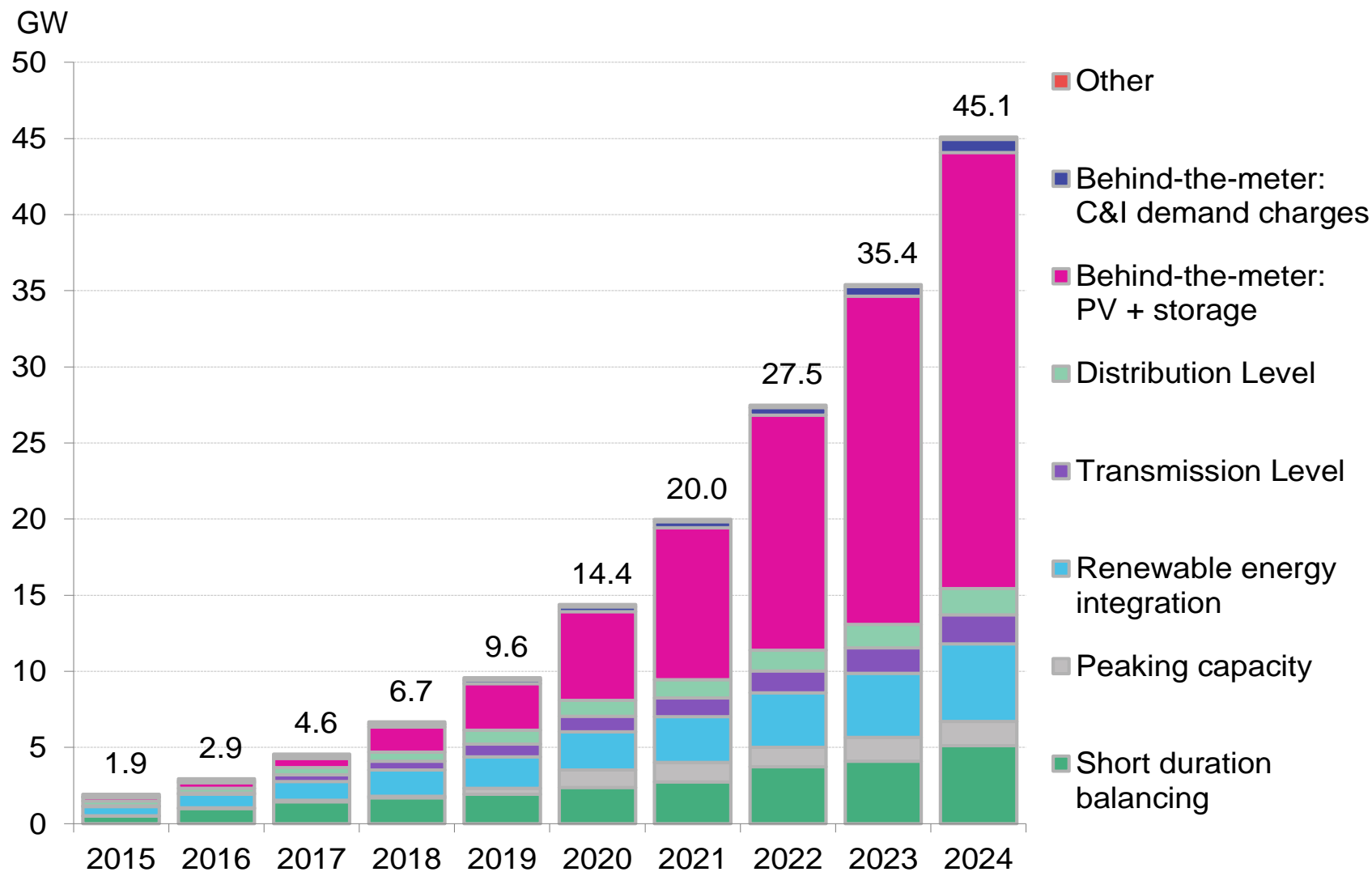
Cumulative installed energy storage by region, 2016-24 (GW)



- Utility-scale storage deployments dominate in terms of total installed power output (MW) in 2016. They make up 84% of total installed capacity. Behind-the-meter energy storage becomes increasingly important throughout the 2016-24 period, and in 2021 it becomes the larger of the two market segments.

- The top five markets are Japan, India, the United States, China, and Europe. They represent 71% of the global total in 2024 for storage installed.
- Between 2016 and 2024, some \$44bn will be invested in storage, compared to \$3.9 trillion in power generation capacity.

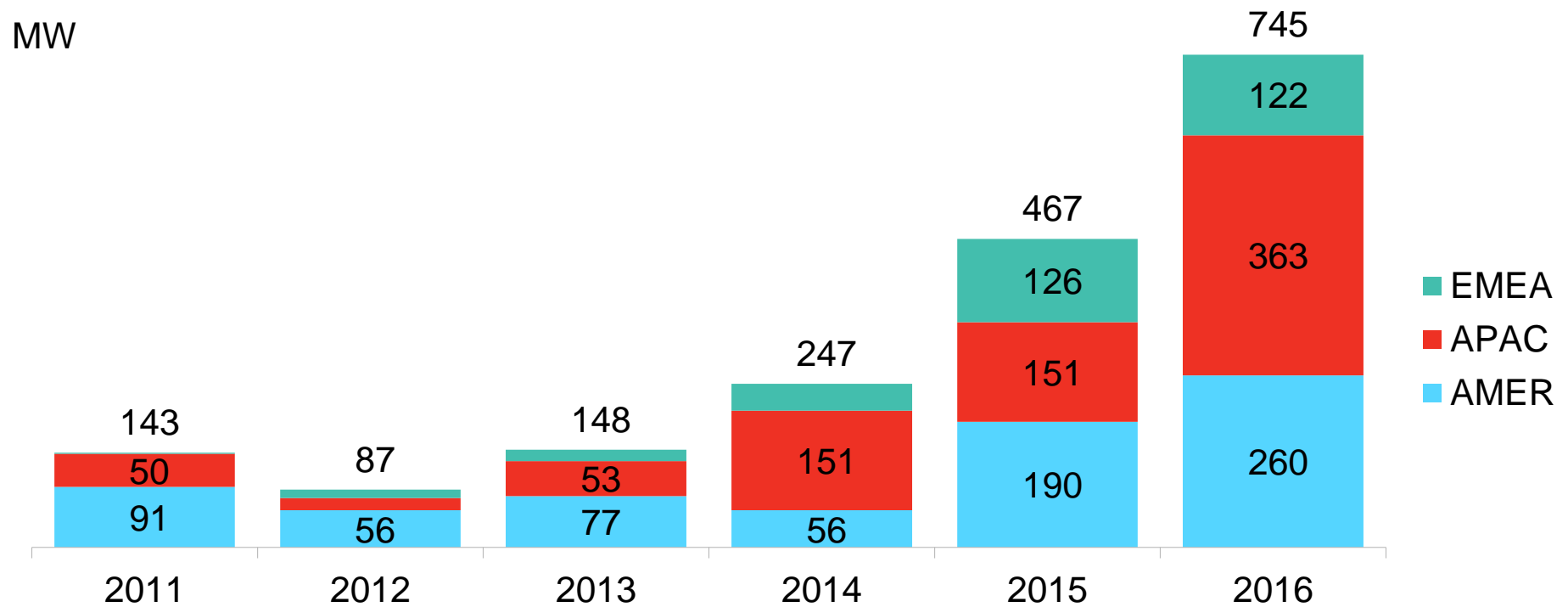
Stationary storage market growth driven by behind-the-meter systems



Source: Bloomberg New Energy Finance

Utility-scale stationary energy storage market growing quickly

Commissioned utility-scale energy storage by region



Source: Bloomberg New Energy Finance

As batteries get cheaper, they unlock new market segments

Utility-scale



Commercial & Industrial



Residential



Vacuum cleaners



Offshore platforms

China intends to dominate global lithium-ion battery manufacturing

Lithium-Ion Battery Manufacturing Asset Map

* indicates the plant produces multiple chemistries

Announced projects are scheduled to be online by end 2021
Under construction projects are scheduled to be online by end 2018



Source: Bloomberg New Energy Finance. Note: Explore lithium-ion battery manufacturing globally with the [Battery Manufacturing Database](#). Note: Tesla's Gigafactory, developed in partnership with Japan's Panasonic Corporation, is counted towards the United States' number.

Operational failures in gas will make batteries a new option

Issue

U.S.

“California May Cap Power Suppliers’ Gas Use After Massive Leak”, *Bloomberg News*

Taiwan

“Gas issues cause nationwide blackout”, *Taipei Times*

Australia

“South Australia’s electricity price woes are more due to gas than wind”, *The Conversation*

Response

U.S.

California utilities aim for world’s fastest energy storage deployment

Taiwan

Taiwan Minister to discuss solutions with Tesla

Australia

Tesla wins world’s largest battery storage project in South Australia

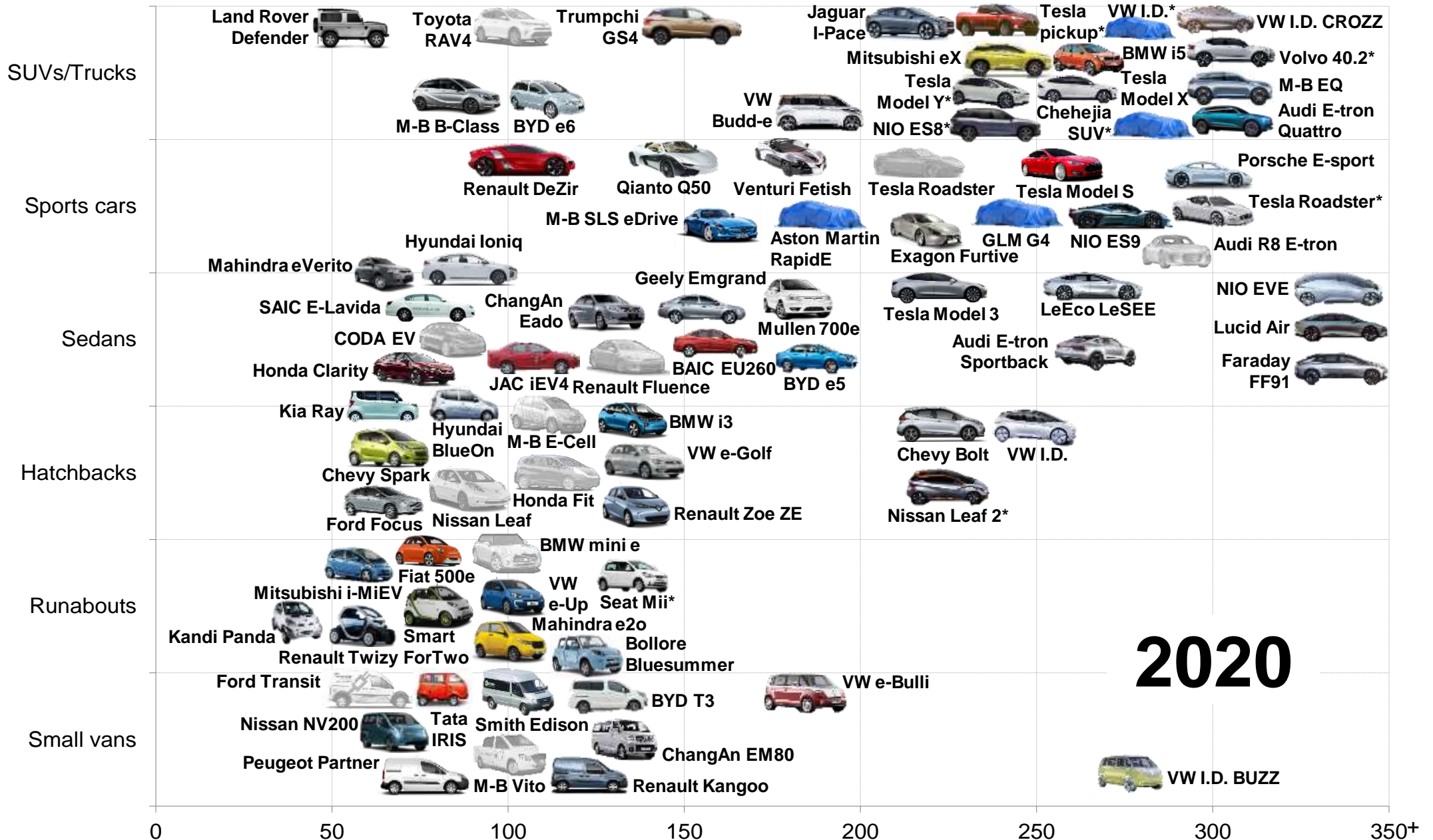
Energy storage: The new normal?

A screen grab from an infrared camera showed the Aliso Canyon leak in December 2015.



Source: Environmental Defense Fund via [New York Times](#)

But it is not only about the Teslas



2020

Source: Bloomberg New Energy Finance, Images various. Notes: Not exhaustive. (*) Range is speculated.

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