

EVs in Norway: Some vital statistics

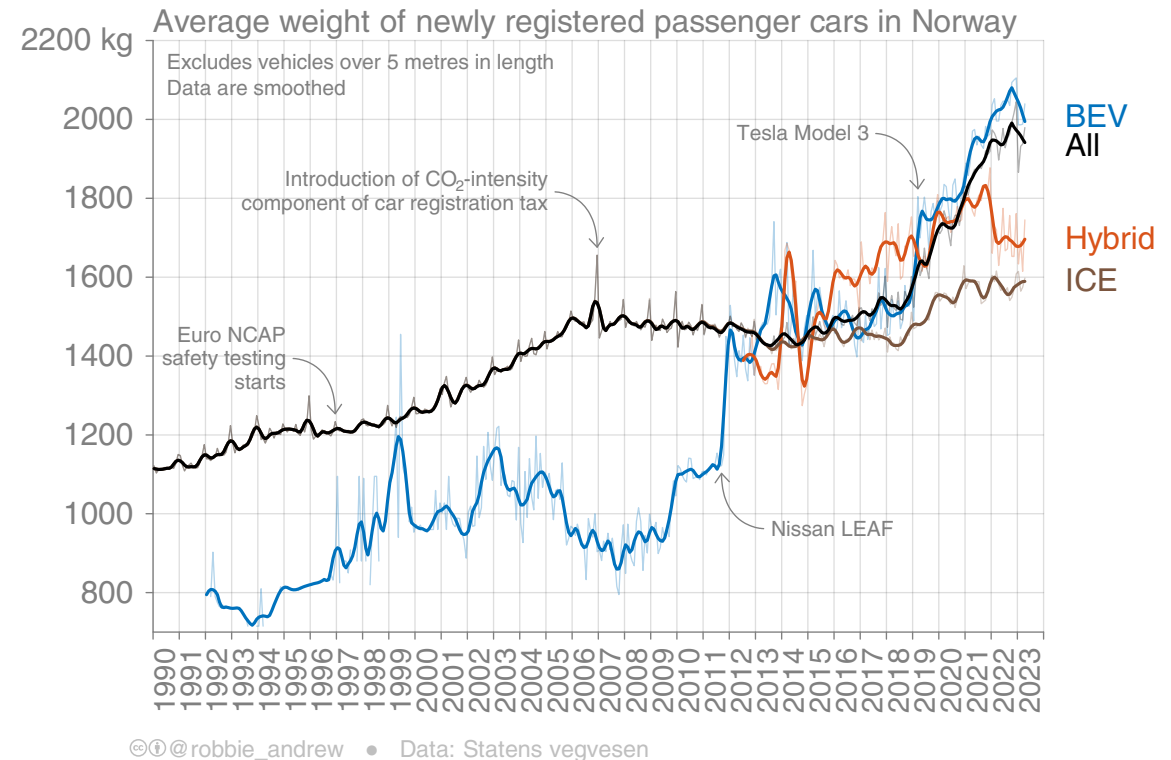
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The average weight of new cars in Norway has increased by ~35% in the last 10 years

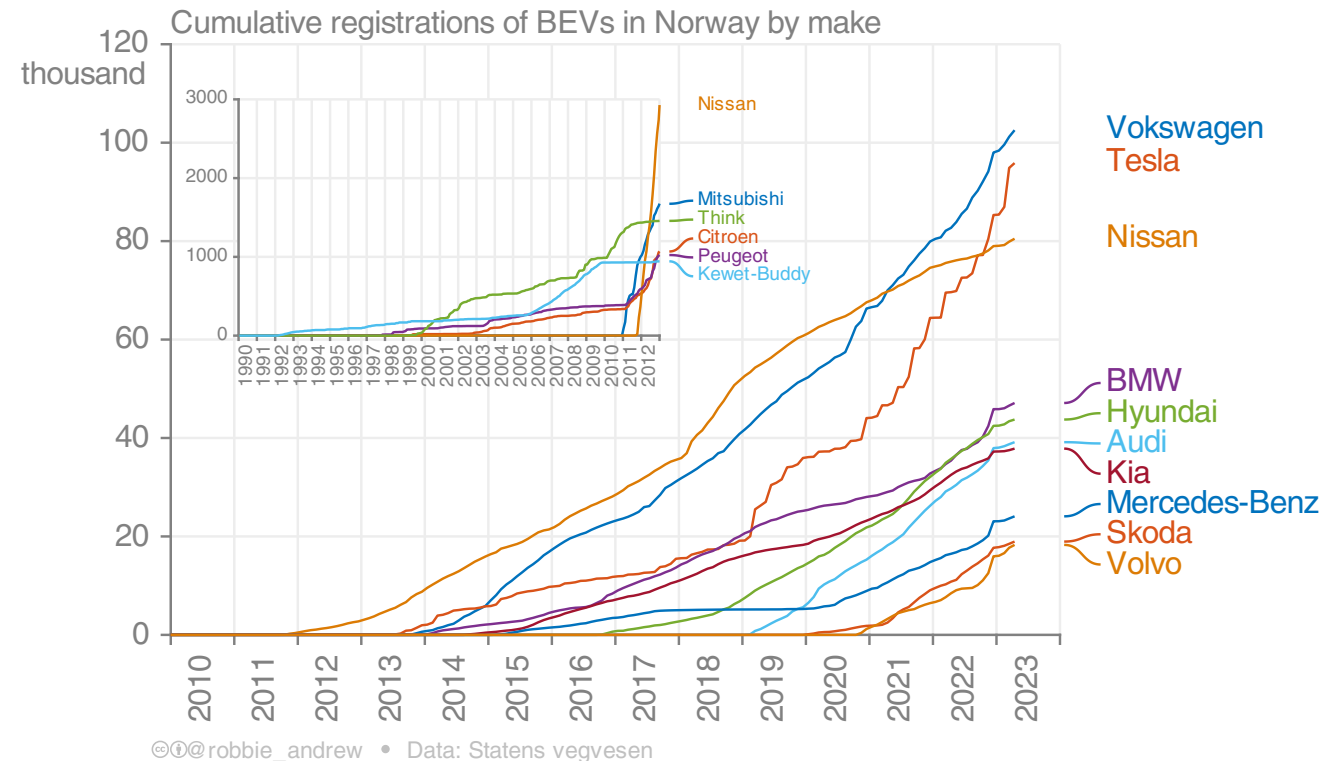
- The average weight of BEVs was for many years much lower than that of cars with internal combustion engines (ICE)
- The arrival of Nissan's LEAF closed the gap virtually overnight
- The arrival of large numbers of the Tesla Model 3 in 2019 was the start of a large divergence
- Significant drop in weight of hybrids from January 2022 due to increase in weight tax (Norway first introduced a weight tax on vehicles in 1927)



All charts show the first time cars were registered in Norway, and include used imports
ICE (internal combustion engine) cars made up almost all sales until 2011, and hence the line lies under the 'All' line on this chart

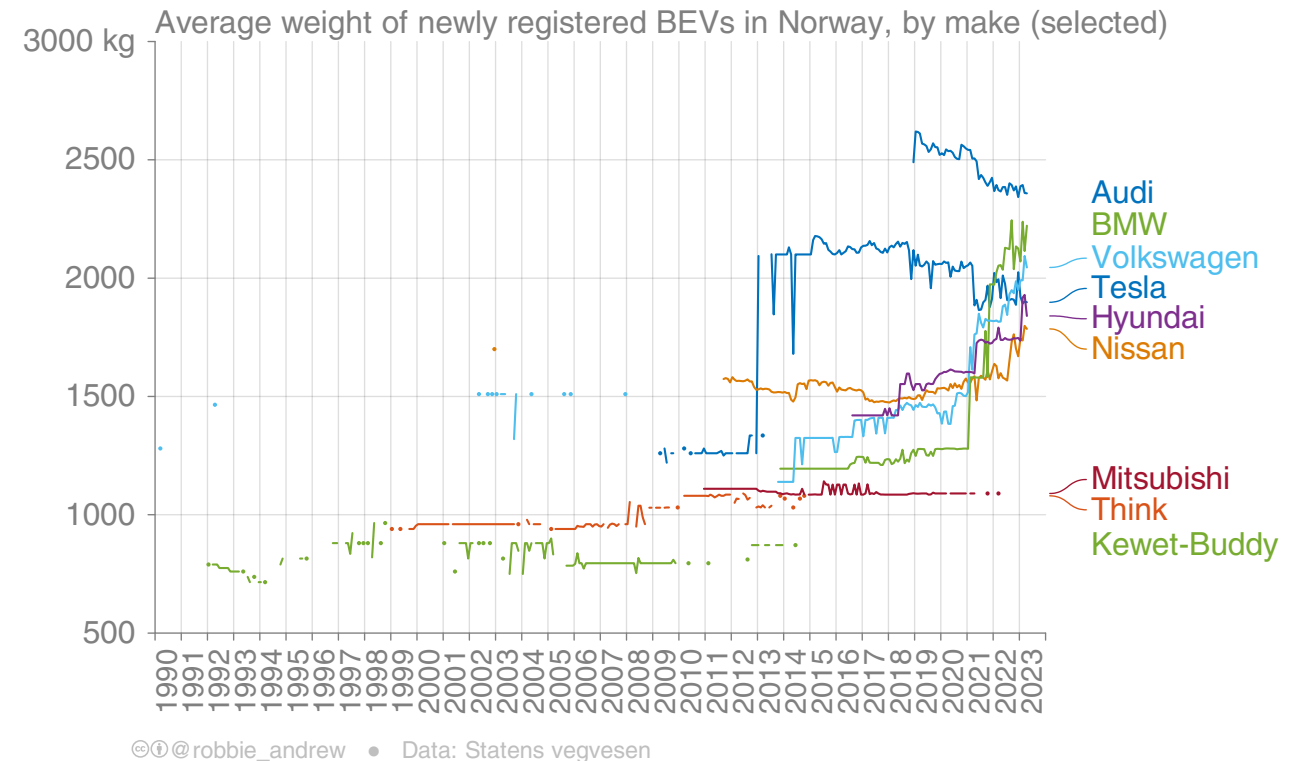
Volkswagen has sold the most EVs in Norway

- BEV growth was seen as exciting in 2010, but then it really started with the Mitsubishi i-MiEV and the Nissan LEAF
- Nissan's LEAF still sells well, after many new models, while other models sold before 2010 are no longer on the market
- The LEAF was a heavier car than most BEVs sold in Norway at the time it arrived



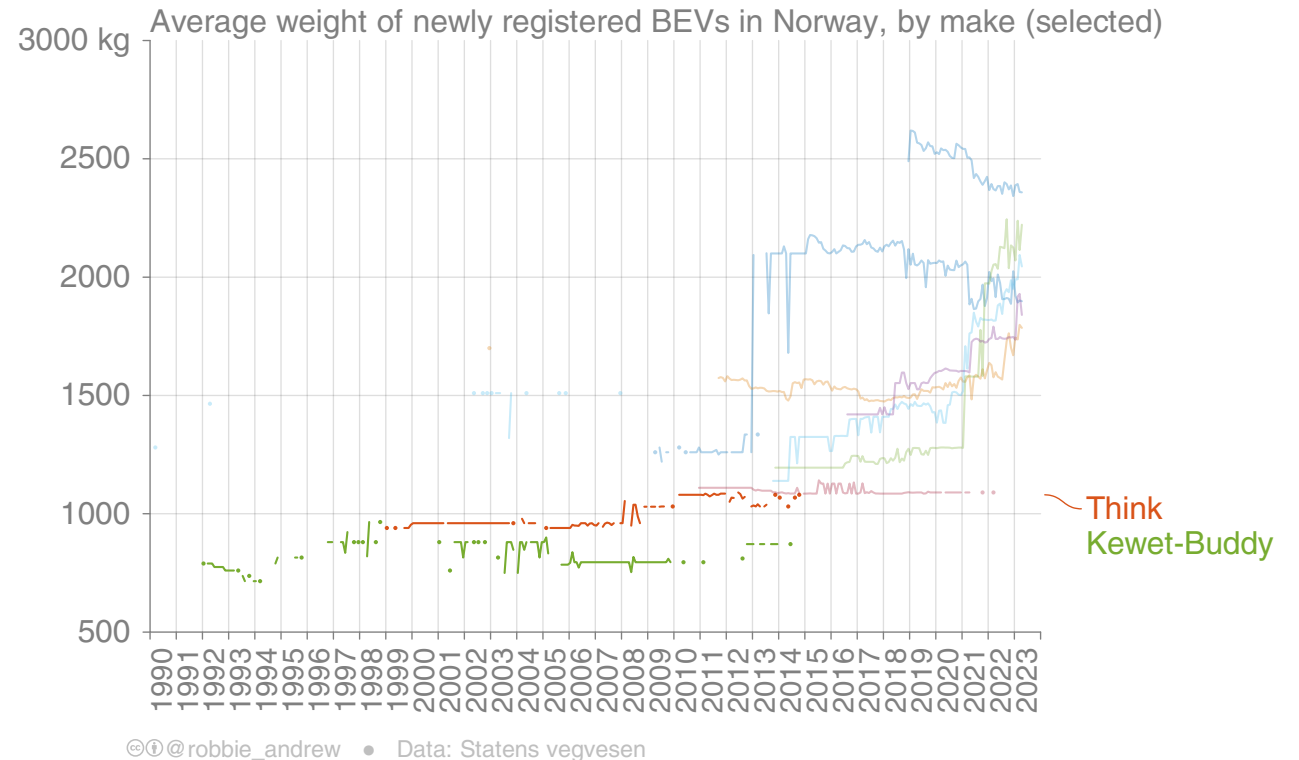
BEV weight by make

- Early BEVs used lead-acid batteries and had fibre-glass or plastic body panels to keep weight down
- Lithium-ion batteries allowed BEVs to become much more like “normal” cars, leading to more widespread adoption
- Any BEV in a certain model category is heavier than an ICE because of the battery
- As BEVs move into the full model range, their average weight has risen over that of ICEs



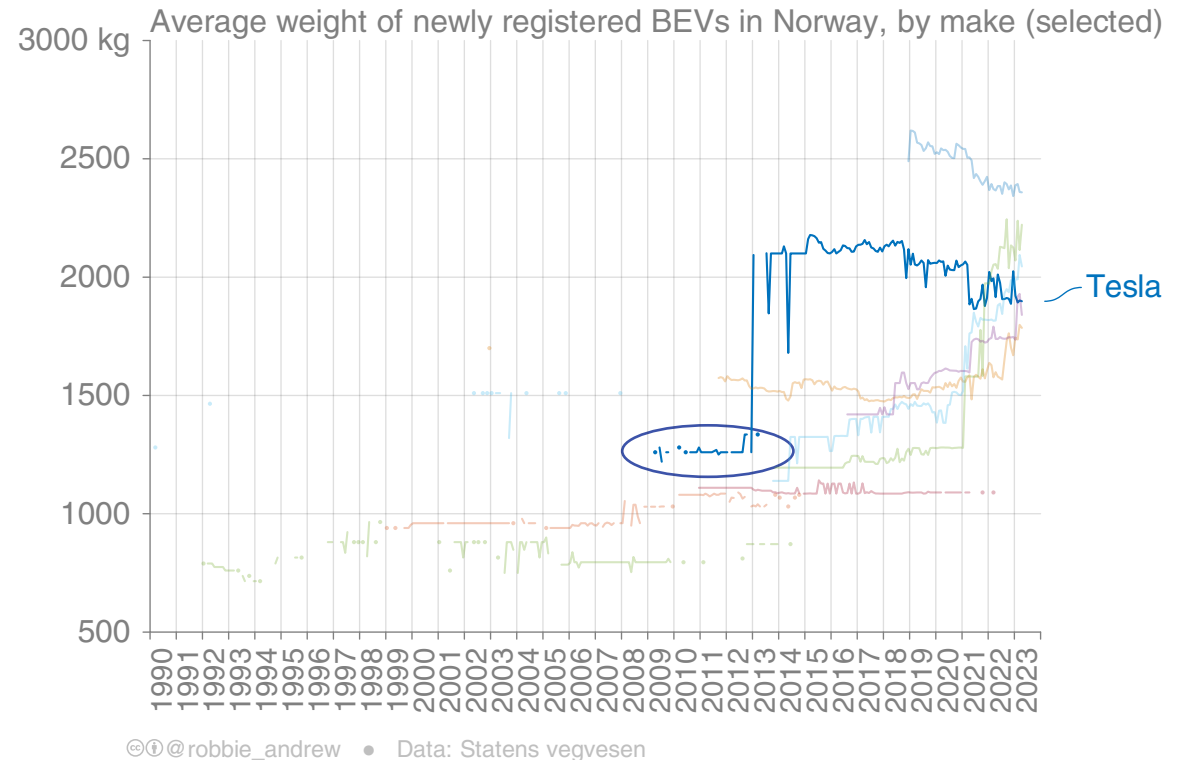
Weight: Early models were very light

- Kewet was a Danish company, but after bankruptcy in 1998, the rights were purchased by a Norwegian company, which changed the car's name to Buddy in 2007
- Think was a Norwegian company with a history going back to the 1970s that made two-seaters with plastic body panels, and was owned for a short time by Ford. But it went under after Ford bailed and then both Mitsubishi and Nissan introduced BEVs that felt more like normal ('real') cars, with four doors.
- Both made very small cars



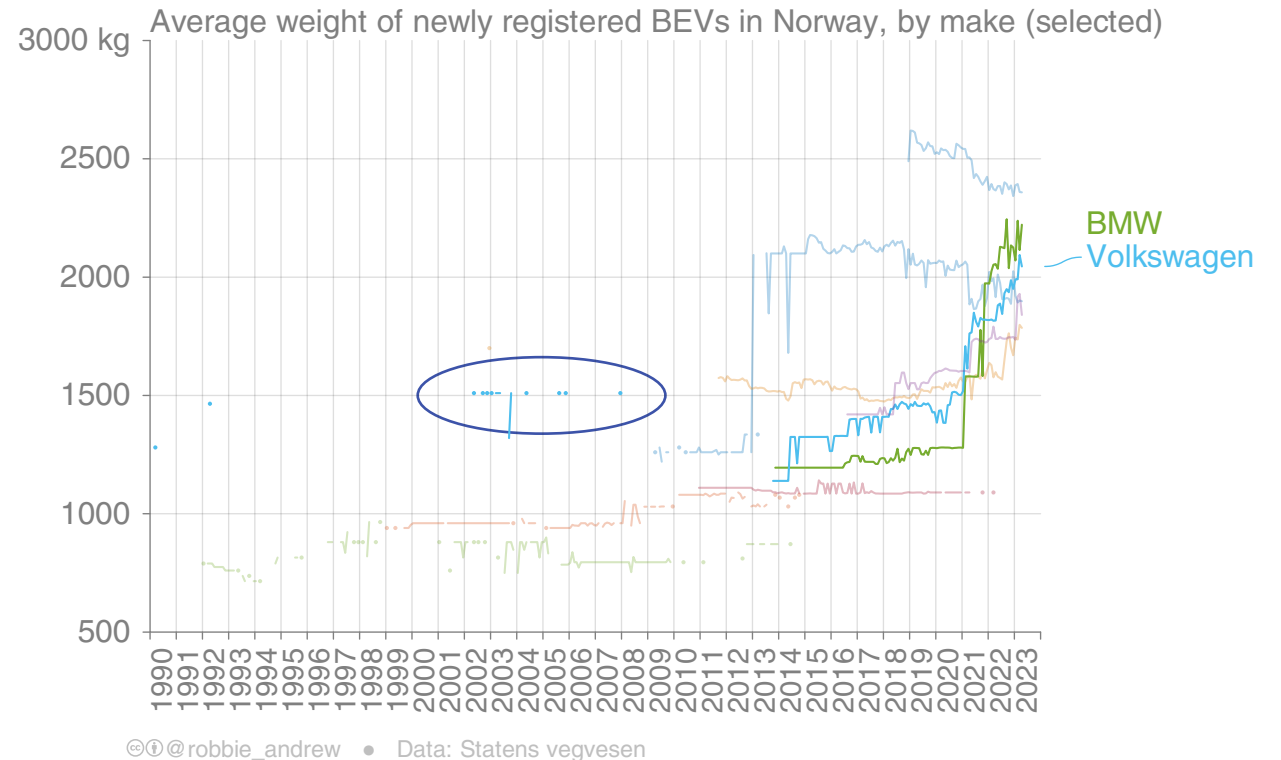
Weight: Tesla

- The Roadster was a light sports car with only two seats and carbon-fibre body panels
 - 450 kg battery of total 1300 kg car
- The Model S arrived in 2013, and was the top-selling model of any type in Norway in both September and December of that year
- The Model 3 and Model Y are lighter models, but still close to 400 kg heavier than the average new ICE car sold in Norway



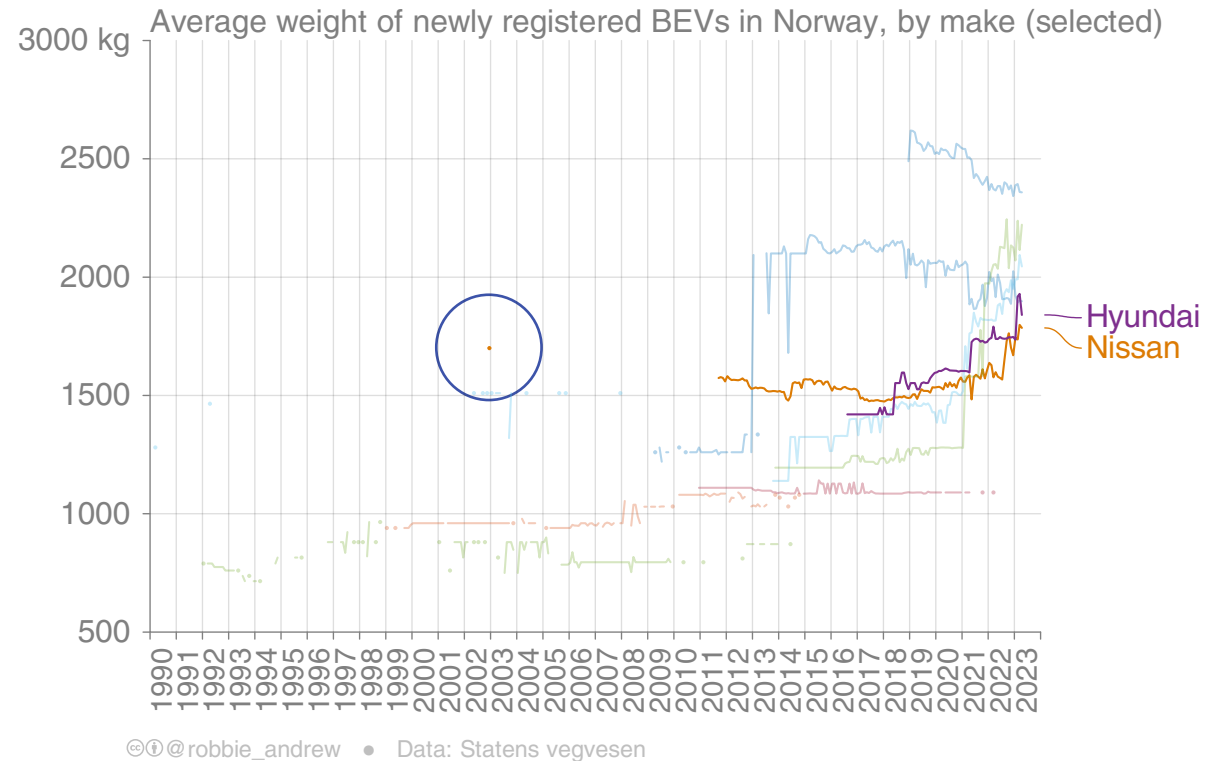
Weight: Broader model range

- Volkswagen started making BEVs in the 1980s with the CityStromer; some arrived in Norway in the 2000s
- VW's early BEV models included the Up!, the name reflecting the fun, cute aspect of the car (i.e., small)
- VW's ID.4, a (heavier) crossover, began arriving in Norway in early 2021
- BMW sold only the subcompact i3 for many years, but has been expanding since 2021 into sedans and crossovers, increasing average weight substantially



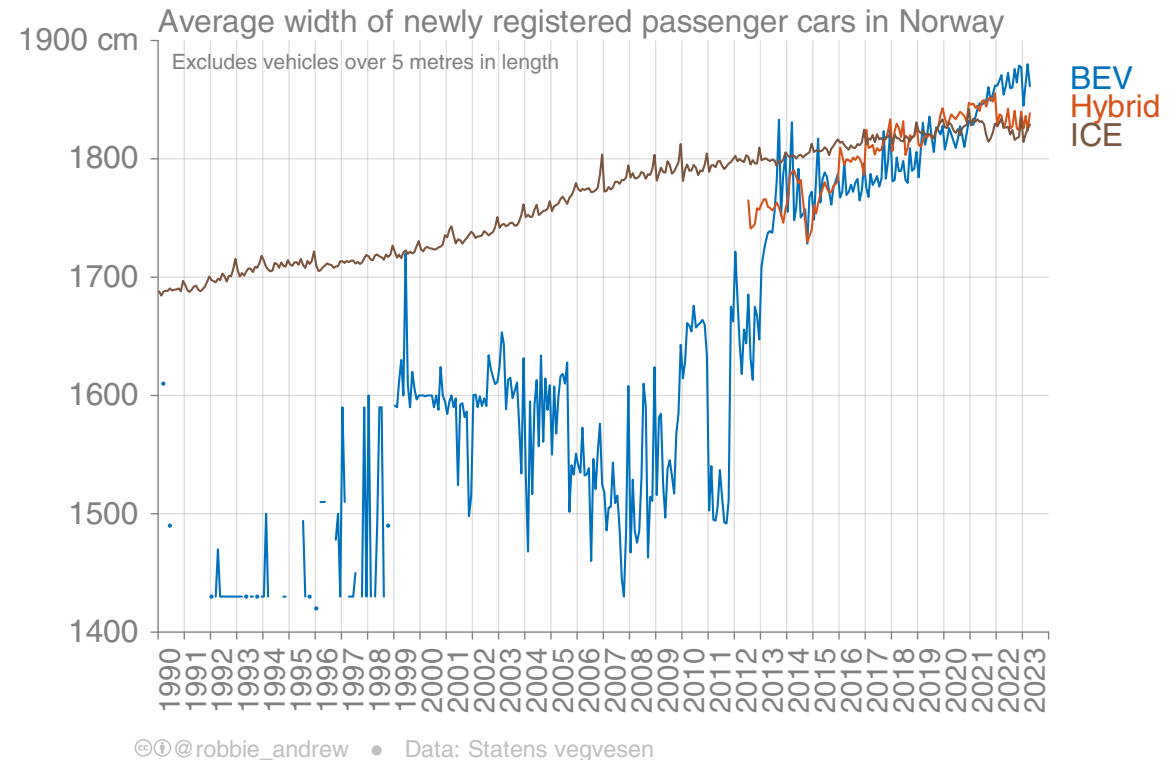
Weight: Broader model range

- Nissan sold only the LEAF for many years, but has recently introduced a crossover, which is heavier
- One Nissan BEV was registered already in December 2002. This was the Prairie Joy EV, the first BEV on the market with a lithium-ion battery. It was used on Spitsbergen by the Japanese researchers there.
- Hyundai also started with lighter vehicles, but as it broadens its model range, the average weight has increased



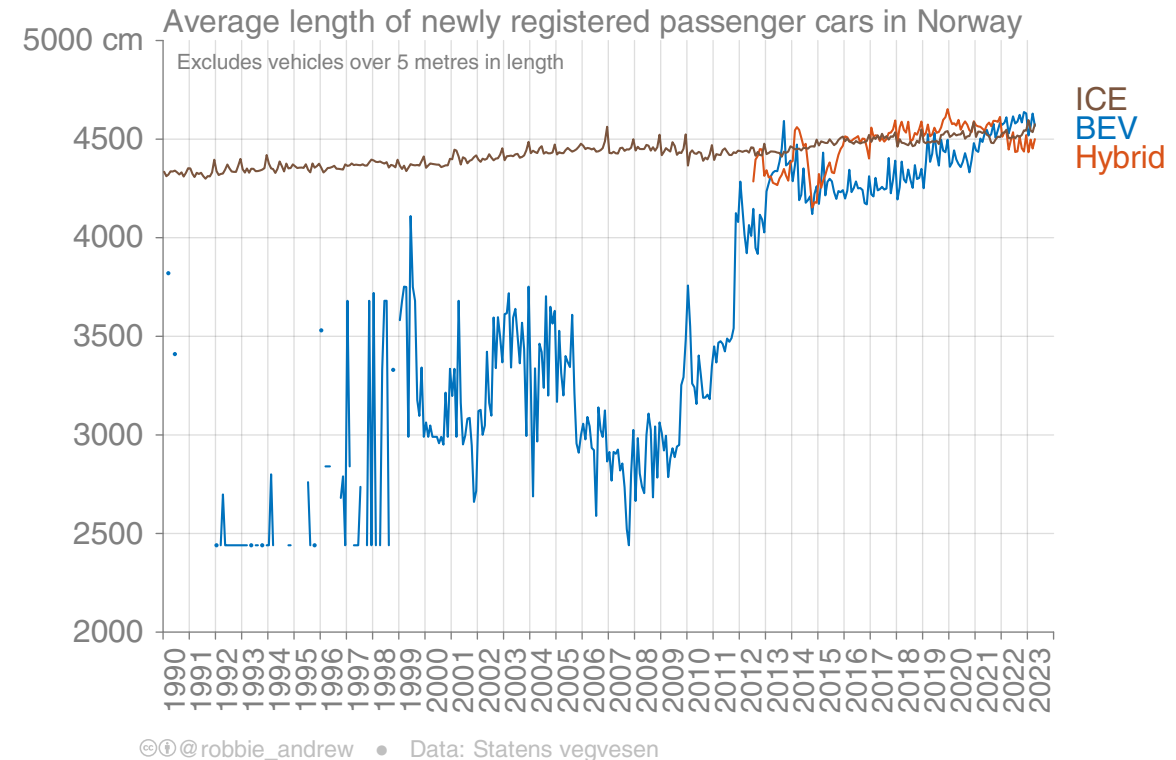
Width of new cars has increased from 1.7m to 1.8-1.9m

- BEVs were generally narrower than ICEs for many years, until the arrival of the Tesla Model S in numbers from 2013 closed much of the gap
- Now BEVs tend to be somewhat wider than ICE cars on average
- 2011: Mitsubishi i-MiEV brought average width of BEVs down
- 2012: Nissan LEAF brought average width of BEVs up again



Length of new ICE cars has increased slowly, but early BEVs were short

- I've excluded cars over 5 metres long because in recent months the number of new ICE cars is very low and the average is now strongly affected by intermittent purchases of campervans, which are classed as passenger cars



Weight matters

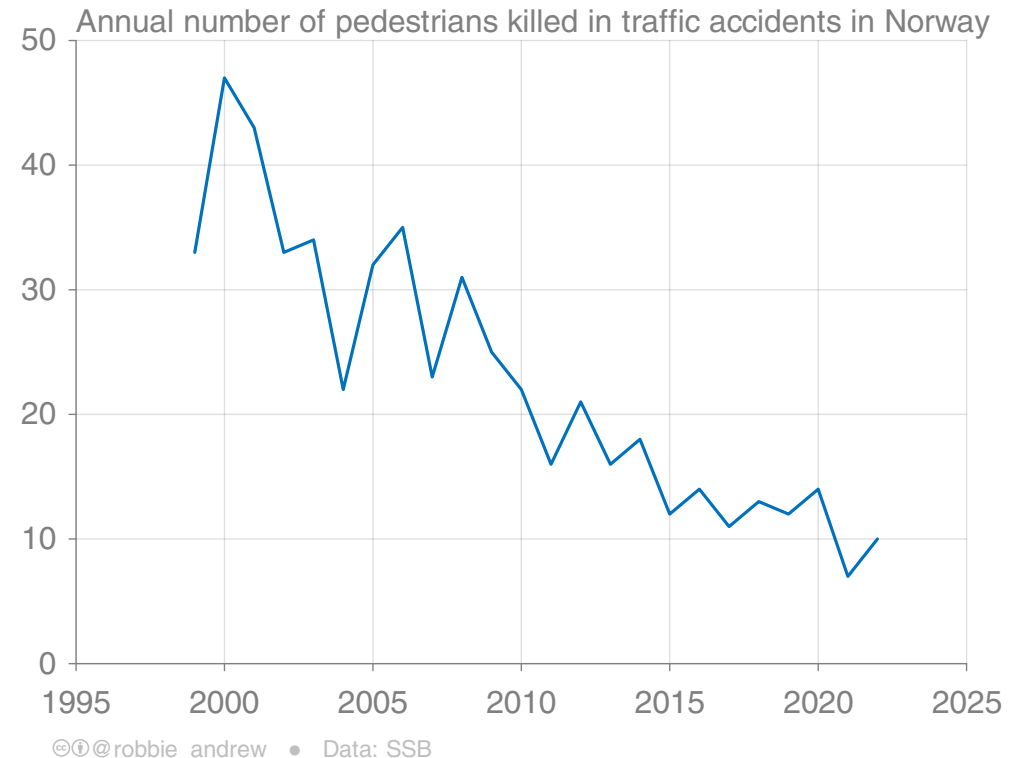
- Particulate pollution: Wear on tyres and road surface, and resuspension of particles on the road surface
- All else equal, BEVs currently wear tyres faster: heavier, higher torque
- Other factors are also important
 - Type of tyre: summer tyres better than all-season; winter tyres worst
 - Temperature: high temperatures mean soft rubber and more wear
 - Driver behaviour: faster acceleration and braking wear tyres more
 - The brand of tyre: the range of wear between brands is a factor of four



Image: The Tyre Collective

Weight matters

- In 2022, the second most common reason that Norwegian drivers of EVs sought roadside assistance was a punctured tyre [[source](#)], possibly more common because of heavier vehicles
- There is no evidence yet that heavier cars have led to more fatal accidents. The trend continues downwards.

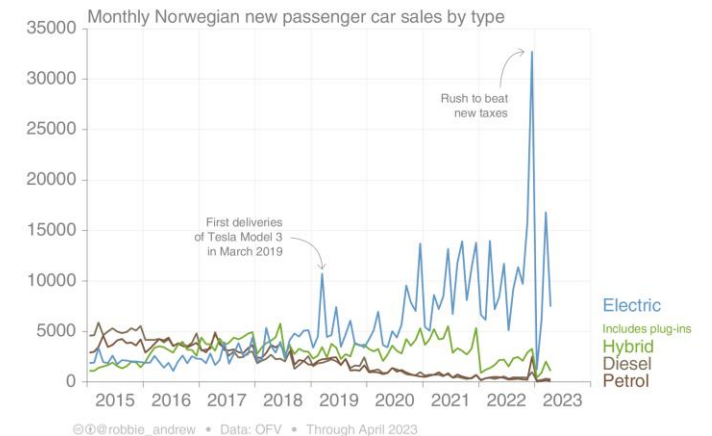
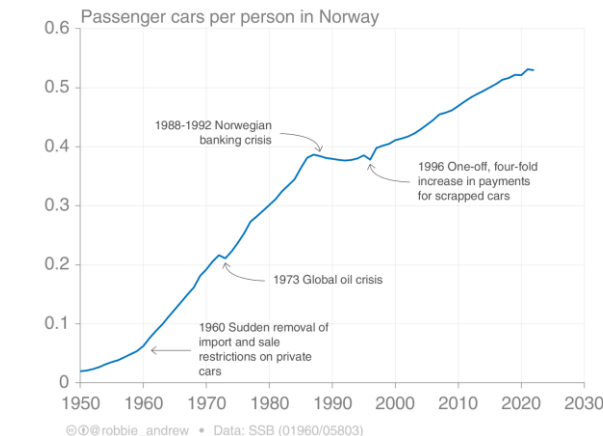
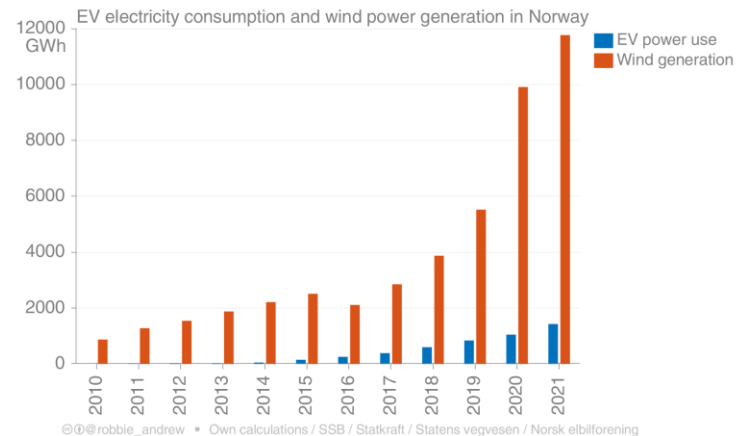
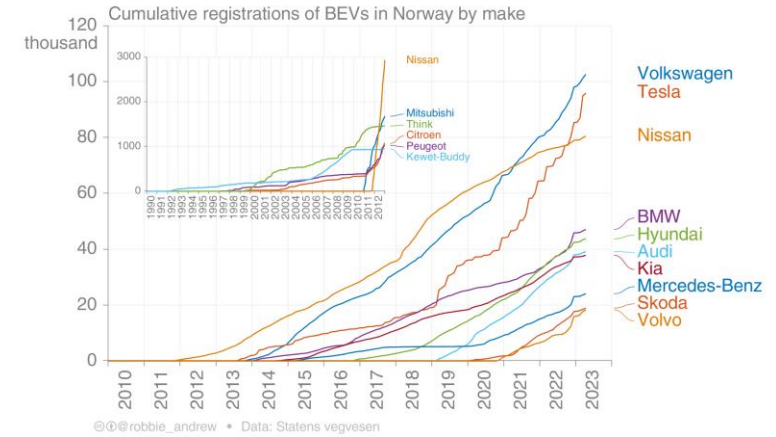
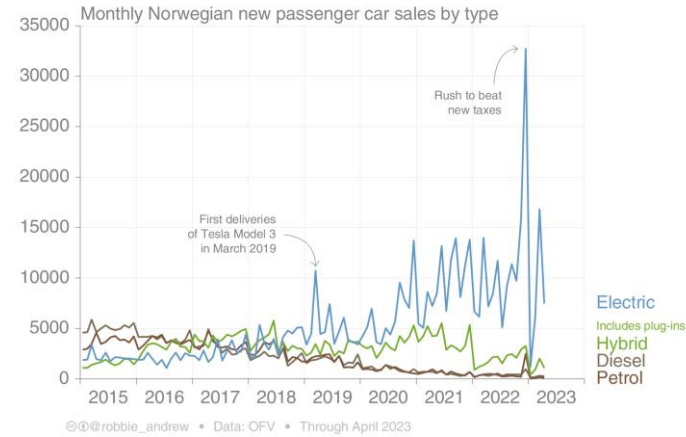
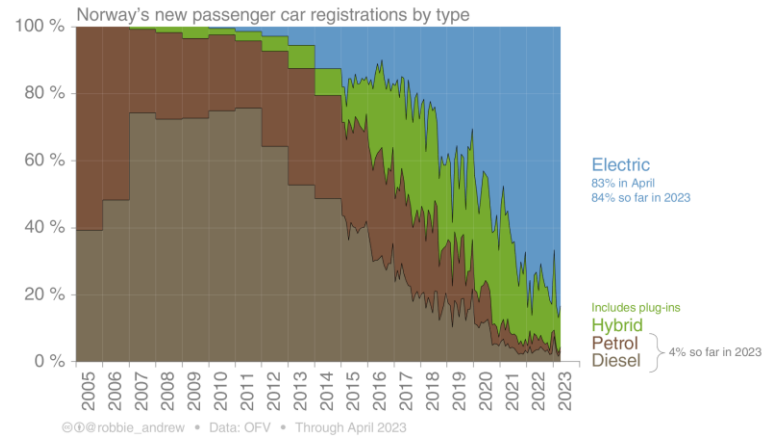


Caveats

- The weight data in Norway's vehicle register are not perfect
- For many years, the weights included 75 kg for the driver, but this has recently been changed, and it is not clear how many, if any, previous records have been updated to the new definition
- The weights of many vehicles exclude 'extras', which in the case of EVs can include larger batteries and substantial extra weight

More data and charts updated frequently on a dedicated web page

<https://robbieandrew.github.io/EV>



Thank you

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