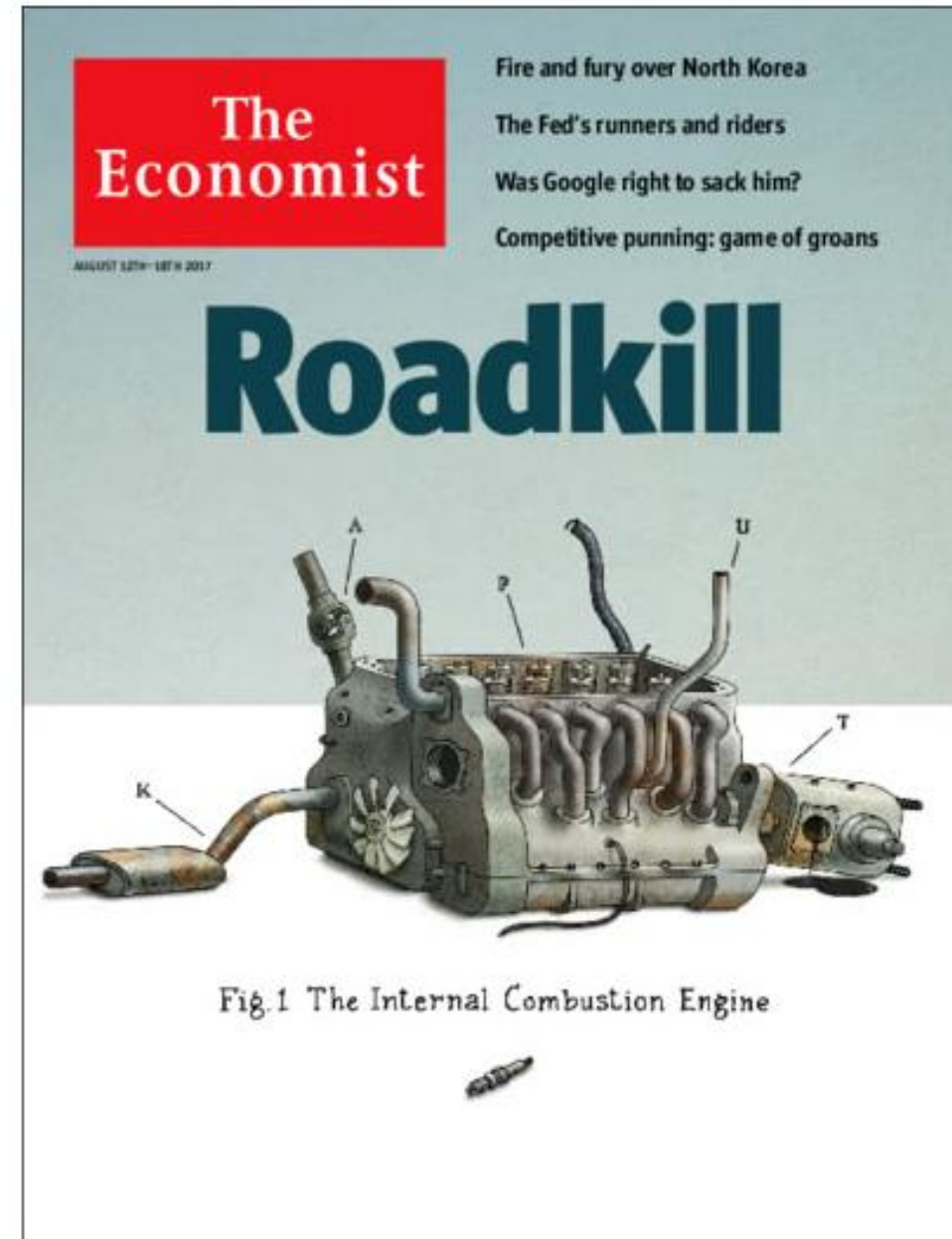


County of Rogaland Emission Free 2024

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The end of the ICE

- The internal combustion engine has had a good run, but it is nearing the end.
- *“The first death rattles of the internal combustion engine are already reverberating around the world – and many of the consequences will be welcome”* (The Economist Aug. 12th 2017)



Kolumbus' Public Transport contracts

- Bus: 6 contracts with ca. 500 buses.
- Ferries & fast ferries: 5 contracts with 13 vessels.
- Bus Rapid Transit system (50km) under construction, will be in operation in 2023. Will be operated by 50-60 battery electrical buses of 18m to 21/24m.

Emissions 2019

- From buses: 19.700 tons CO₂ per year.
- From vessels: 18.500 tons CO₂ per year.

Status Emission Free, August 2019

- Kolumbus was first in Norway (2015) to put el-buses in regular service. Today 5 el-buses are in regular service in Stavanger.
- Kolumbus proposed el-buses for the Ryfylke Sør contract; rejected by the majority in the County Council as too expensive.

Status Emission Free, August 2019

- Kolumbus proposed el-buses in two options for the Haugalandet contract; the County Council selected the smallest one, with 17 el-buses for ca. 28 % of the in-service kilometres.

Further Implementation, bus:

- Bus contracts for Nord-Jæren, Jæren and Dalane (total of up to 350 buses) will be tendered in 2023-25. Start of service 1.7.2024-26, duration of contract 7 + 3 years.

Further Implementation, bus:

- Stortinget passed the Climate Act in 2017, requiring national CO₂-emissions to be cut by 50 % by 2030, and 95 % by 2050 (compared to emissions in 2016).
- As a consequence, fossil diesel will not even be allowed, and zero emission buses will be default in public transport contracts from 2021 onwards.

Emission Free Bus Services

- *In our opinion:*
- Buses should have battery capacity of at least 450 kWh.
- Charging (ca 40-50 kW) must be overnight at the depot.
- Supercharging (>250 kW) must be available at select locations.
- Bus manufacturers that do not - at this point in time - invest massively in production of battery powered buses, will become obsolete within 5 years.