



URBAN VEHICLE ACCESS REGULATIONS IN NORWAY



THE CIVITAS INITIATIVE
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EUROPEAN UNION

GRAZ



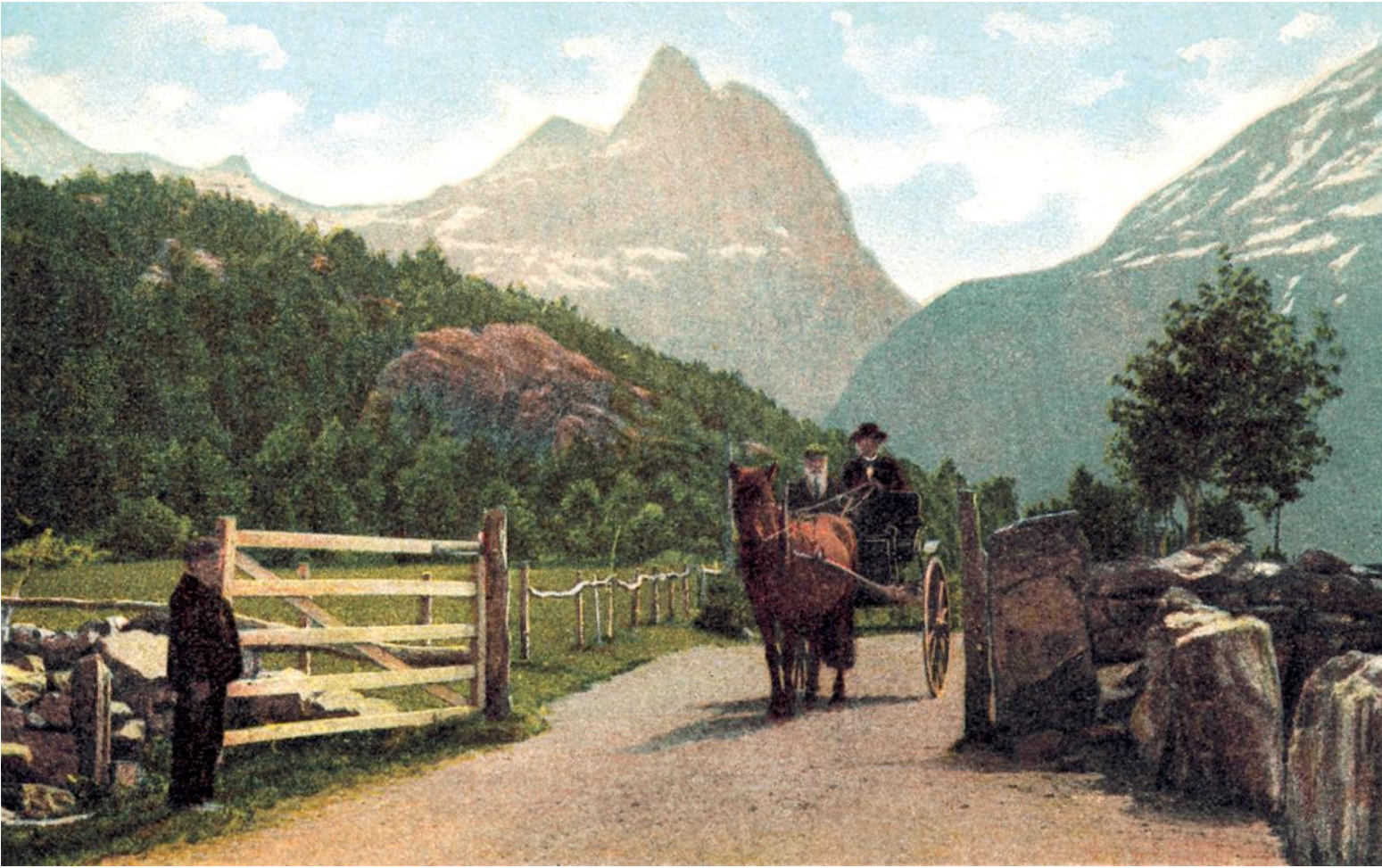
HEIMO HAUB
EFKON GMBH
LEVEL OF SECRECY: PUBLIC
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ROAD TOLLING THE NORWEGIAN WAY

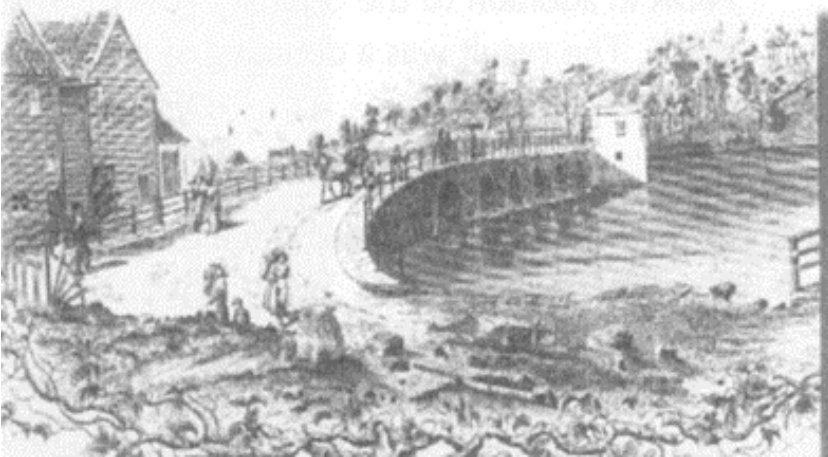


NORWAY HAS A LONG HISTORY OF TOLLING A GATE BOY – AN EARLY PRICING PRACTICE



EARLY TOLL PROJECTS (BERGEN THE PIONEERING CITY)

NYGÅRD'S BRIDGE



- The Nygård's Bridge was built by a private company as a toll project in 1851. Tolls were collected from both vehicles and pedestrians until 1871.

PUDDEFJORD BRIDGE, ...



- A demanding topography created a willingness to pay for tunnels and bridges
- A private tolling company was established in 1953 by an enthusiastic merchant Fritz C Rieber and built and operated the Puddefjord Bridge, Eidsvåg Tunnel, Løvstakk Tunnel and the railroad Tunnel through the Ulriken mountain.



HISTORICAL TOLLING SOLUTIONS

OSLO TOLL RING BEFORE 2008

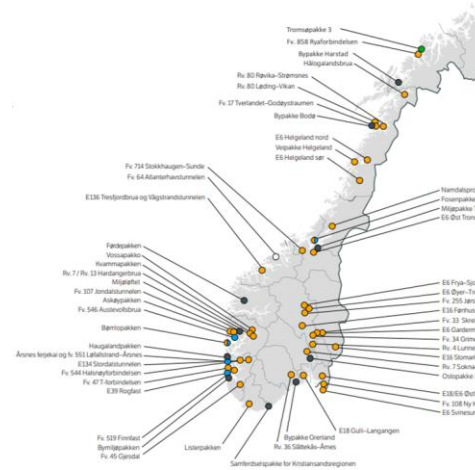


COIN MACHINES



ROAD TOLLING IN NORWAY

- Main purpose of road tolling in Norway is to raise funds for infrastructure, not to regulate traffic
- App. 250 toll sections („charging points“) are currently in operation
- Fees are collected either by DSRC or by automatic number plate recognition
- The AutoPASS toll tag may be used at all automatic toll stations in Norway. It may also be used in Denmark and Sweden on ferries and bridges
- The AutoPASS tag is linked to the registration number of your vehicle.
- The tag will be sent to you by post.
- The tag must be attached to the inside of the front windscreen.



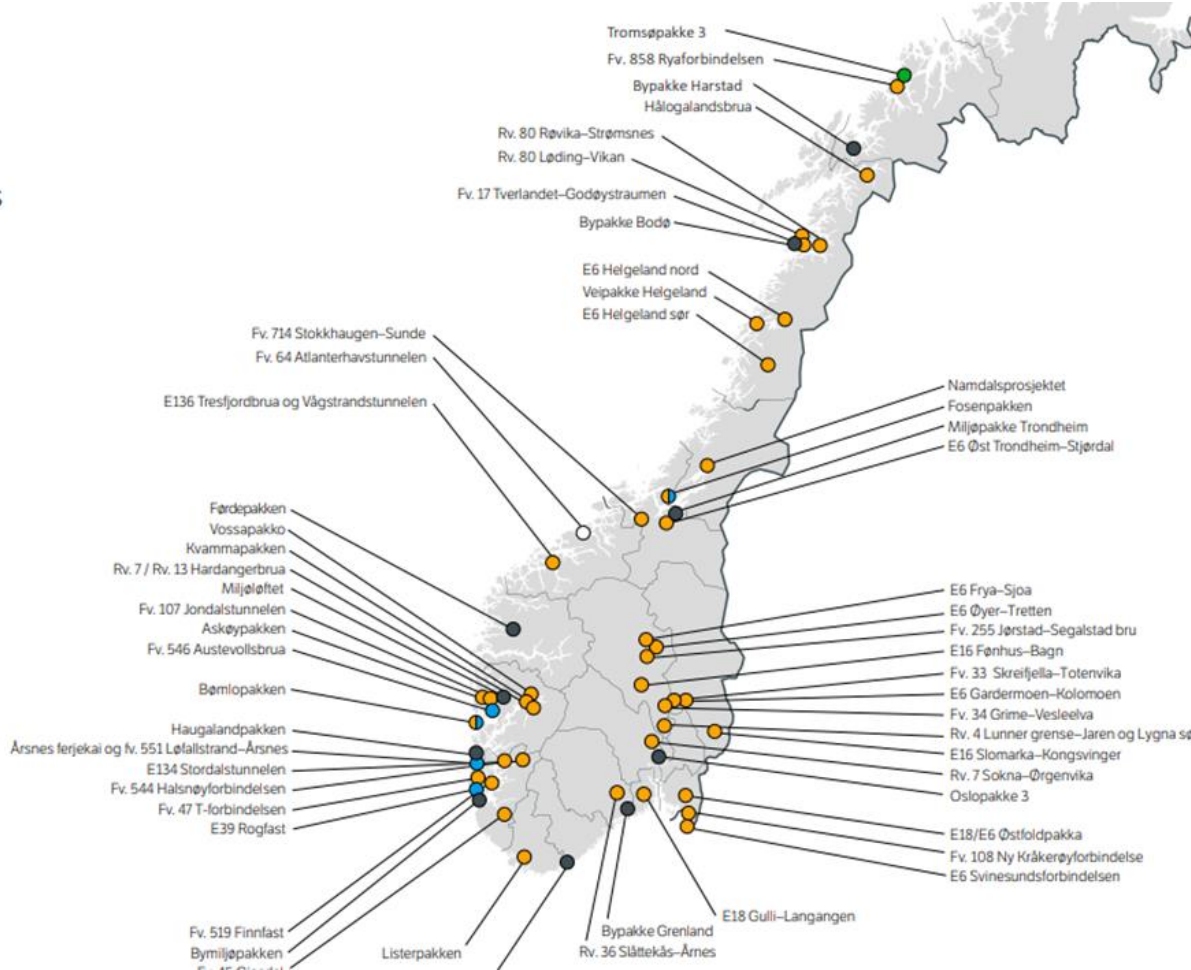
- In 2017, almost NOK 10.2 billion were collected on Norwegian toll roads through 63 road toll projects.
- The toll revenues stem from approximately 650 million toll transactions.
- At the start of 2018, Norwegian toll service providers had electronic tags in 2.2 million vehicles.

Source: The Norwegian Public Roads Administration (NPRA)



TOLLING PROJECTS AND CATEGORIES

- Road toll collection
- Urban toll rings
- Toll collection on ferries
- Local fuel tax
- Manual toll collection



Coastal projects replacing ferry links

- bridges, sub sea tunnels

Projects on main roads connecting inland cities

- capital road construction, major improvements

Toll Rings in the largest cities

- capital road construction, transit infrastructure, bikeways and pedestrian network

Source: The Norwegian Public Roads Administration (NPRA)



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EFKON SOLUTION FOR NORWAY



2019 REFERENCE PROJECTS

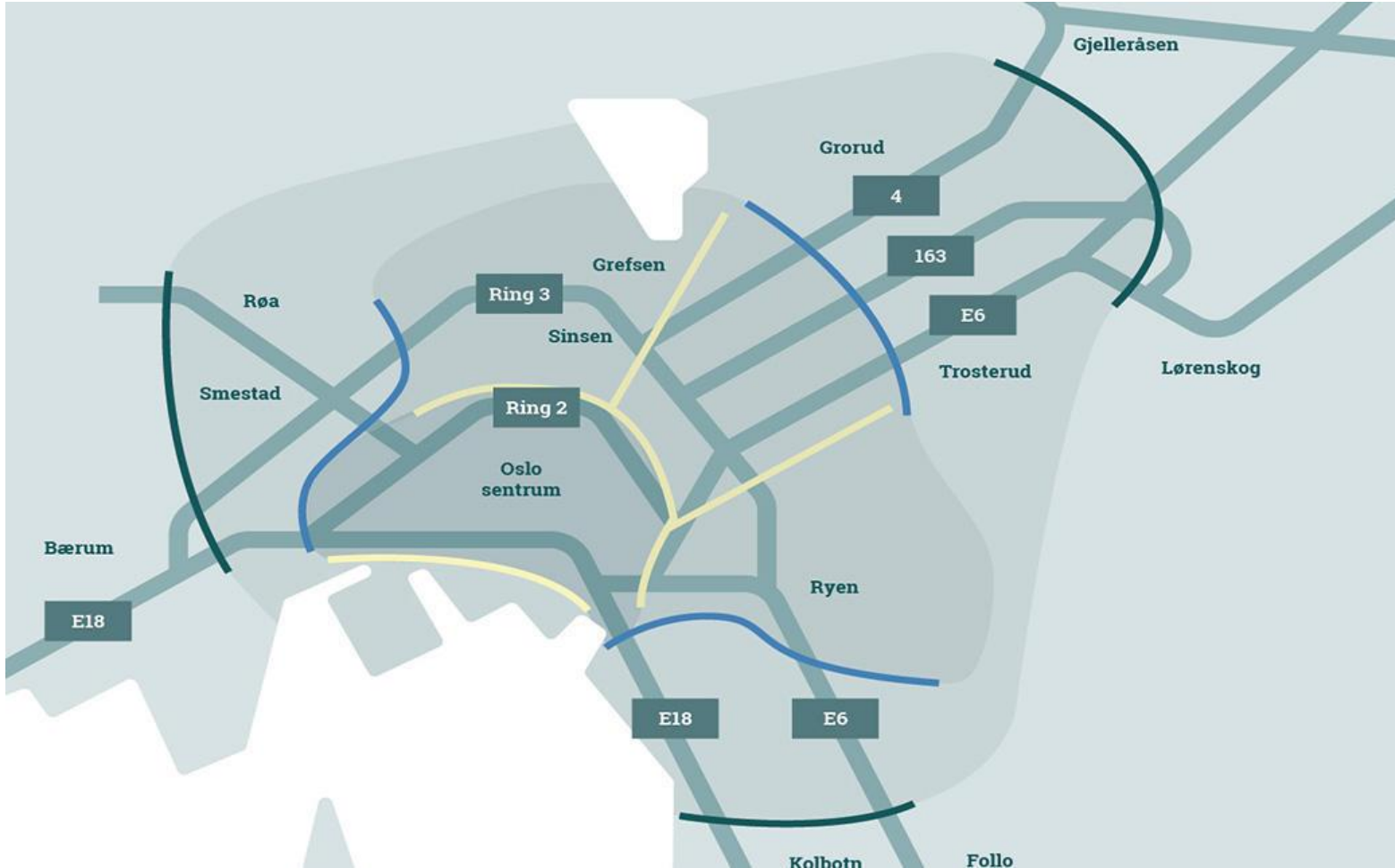
- BERGEN



- OSLO



OSLO TOLL EXTENSION BY JUNE 1ST 2019 (OSLOPAKKE 3)



- Lower price per toll crossing
- More crossings in total
- Three different toll rings:
 - Indre ring (pay both ways)
 - Entirely new toll ring
 - Placed in the center of Oslo (Ring2)
 - Osloringen (pay both ways)
 - The “old” Oslo toll ring
 - Bygrensen (pay only in to Oslo)
 - This toll ring is placed along the border between Oslo and Akershus

© city map by Fjellingen



CHALLENGE: INFRASTRUCTURE



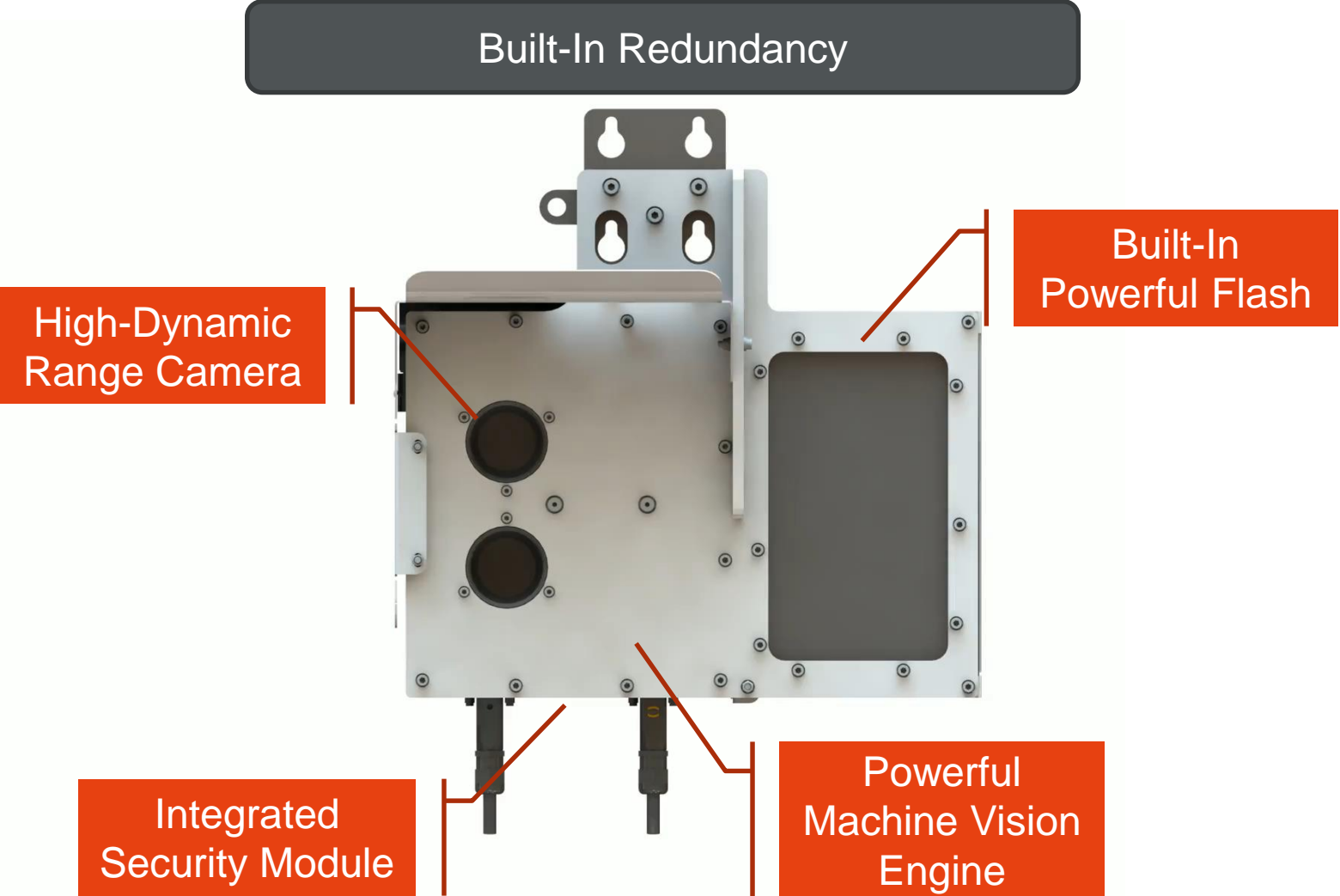
CHALLENGE: AMOUNT OF EQUIPMENT

TYPICAL 2 LANE – FRONTSHOT ONLY / REDUNDANT



THE ALL NEW EFKON N-FORCE AVT-100

ONE-BOX SOLUTION COVERING 2 LANES

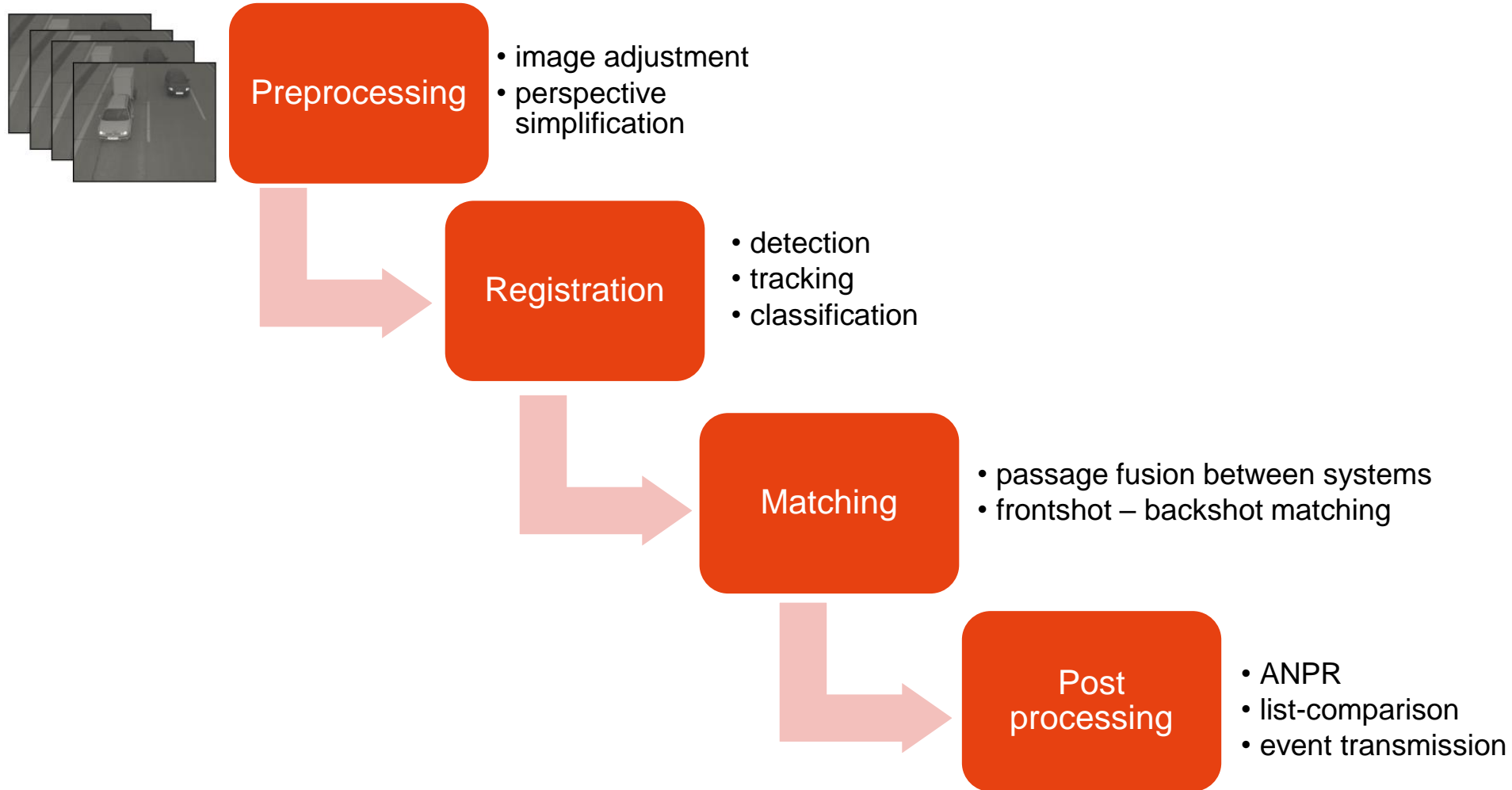


SLIM INSTALLATIONS POSSIBLE



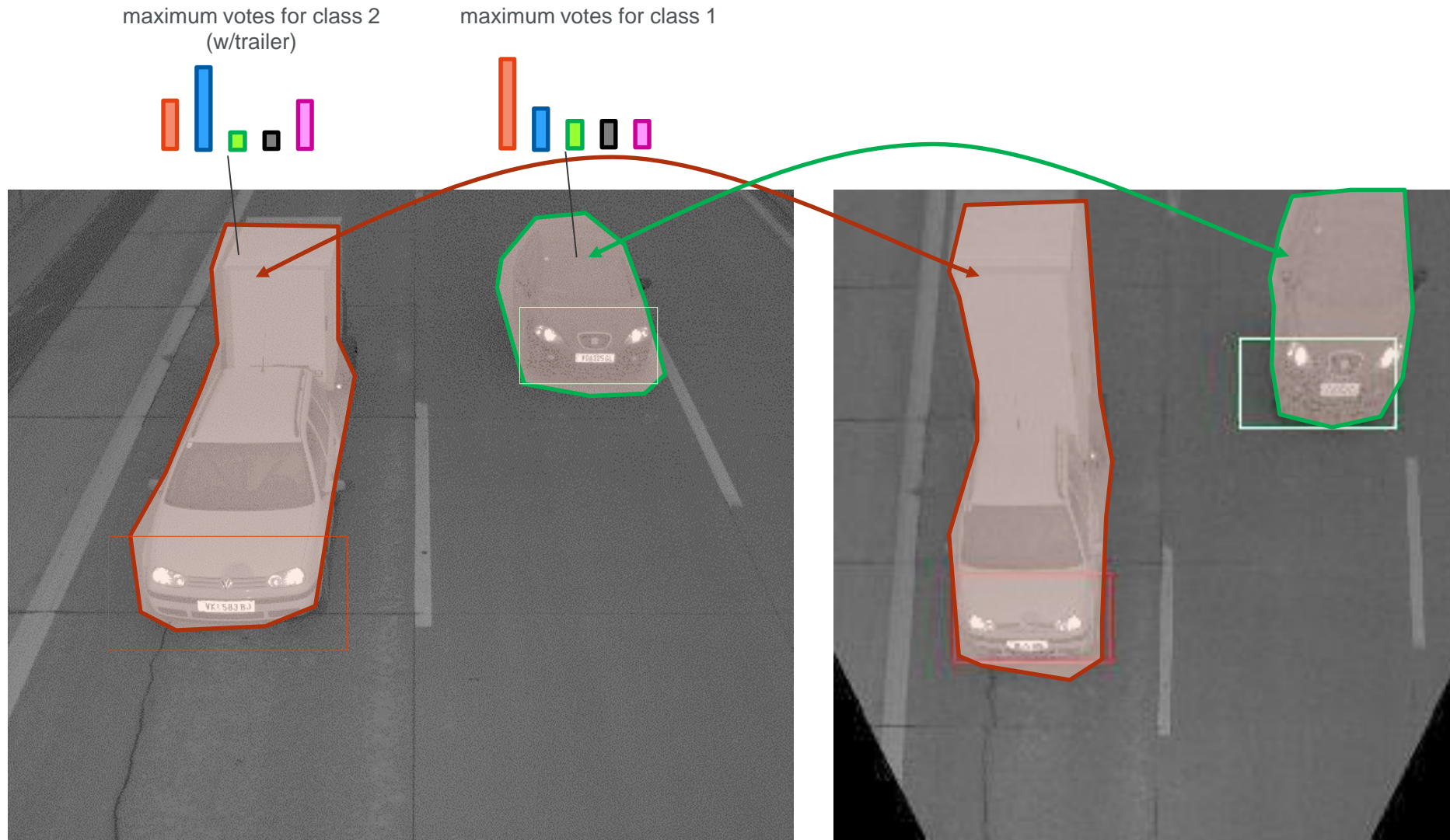
CHALLENGE: PERFORMANCE

EXTENSIVE USAGE OF MACHINE VISION



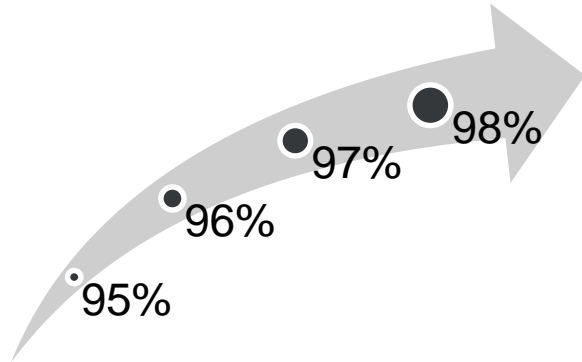
EXAMPLE: CLASSIFICATION

MACHINE LEARNING BASED ANALYSIS OF FEATURES



VIDEO TOLLING SENSOR PERFORMANCE

ANPR RATE



ANPR ERROR RATE

@ < 0.1%

NUMBER PLATES



Requires excellent image acquisition, image processing, detection and matching

ABOUT THE TOLLS

SLIM SOLUTION



FACTS ABOUT THE NEW TOLL RATES

- Congestion charge and environmentally differentiated rates in all toll rings
- Electric cars pay for toll crossings
- You only pay for one toll crossing during one hour in Indre ring and Osloringen, and one toll crossing during one hour in Bygrensen
- In Indre ring and Osloringen, you pay at maximum 120 toll crossings per month, and a maximum 60 toll crossings in Bygrensen
- The discount with an AutoPASS account for rate group 1 increases from 10 % to 20%
- There is no discount for heavy vehicles when you have an AutoPASS account
- Fjellinjen AS has about 650 000 agreement customers, and about 1 million crossings per day (Oslopakke 3)



ABOUT THE TOLLS

LESS INTRUSIVE



„LOW EMISSION ZONE“

- It is more expensive to pass during rush hour (6.30–9am and 3–5 pm)
- Regular prices apply to gasoline and hybrid vehicles
- It is more expensive to pass with a diesel vehicle, cheaper with electric cars, and free with hydrogen-driven cars.
- Toll Rates by October 2019 (Samples for group 1)
 - Innermost ring:
 - Regular: 17 NOK (21 NOK @ rush hour)
 - Diesel: 19 NOK (23 NOK)
 - Electric: 4 NOK (8 NOK)
 - Two outer rings:
 - Regular: 21 NOK (28 NOK @ rush hour)
 - Diesel: 25 NOK (31 NOK)
 - Electric: 5 NOK (10 NOK)
- Group 2 pay 0 NOK if zero emissions



WHAT THE TOLL IS USED FOR

OSLO OPERA



OPERATED BY



TOWN DEVELOPMENT AND ROAD RELATED PROJECTS

- Fjellinjen AS is owned by Oslo commune (60%) and Akershus provincial commune (40%).
- Fjellinjen is the most important financial benefactor to road construction in Oslo and Akershus for 25 years.
- A steering committee consisting of the state (DG National Road Authority and National Railway Authority), Oslo City (Vice Mayor environment and transportation) and the County Mayor of Akershus make a proposal for investing the toll income in transportation infrastructure projects (public transportation, road investments, bicycle investments, operating costs public transportation etc.).
- Many important road construction projects in the region are partly or completely funded by toll points. In 2017, Fjellinjen AS contributed about 2,6 Mio NOK to road construction.





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