CBC 2014-2020
SOUTH-EAST FINLAND - RUSSIA

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South-Eastern Finland
University of Applied Sciences

Aikuiskoulutus TAITAJA

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KOUVOLAN SEUDUN AMMATTIOPISTO

ETU "LETI"
SAINT PETERSBURG ELECTROTECHNICAL UNIVERSITY

Automotive cluster
ANW

In Transition

Passenger Cars in Finland 2020 - 2030

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Race4Scale

Content

1.
The Reseach

Purpose of the research

- The research aims to identify trends, driving forces and weak signals regarding and around passenger cars in Finland from 2020 to 2030 with the objectives to
  a) publish a report based on the results in a relevant publication, and
  b) present the results in the Future Professions workshop.

- The research forms an informational foundation for further activities in the Race4Scale project.
  - Mainly, in the Future Professions workshop the participants, e.g., students, teachers and business community will interpret the information to analyze competence development issues and opportunities, and furthermore map future professions in the Finnish automotive ecosystem.

Content of the research

- The research focuses on the technological change regarding passenger cars.
  - To provide an effective scope, motorsport, trucks, trailers and lorries are out of scope.
- The research bases on literature and 11 interviews of experts
  - Interviewees from public office to interest groups, and research organizations to private sector, technology to business, environment to social and regulation
  - Broad scope but the research does not claim to be exhaustive

2. The Current State of Passenger cars in Finland

Modes of Transport

- Passenger car is the dominant mode of transport
- On average Finns made 2,7 daily trips with total distance of 41 kilometres
  - On average 1,6 trips and 31,1 kilometres either as the driver or a passenger on a passenger car
- Regional differences exist as, e.g., the infrastructure and public transport options vary
  - Percentage of trips in passenger cars: From 47 % in Helsinki to 70 % in western Uusimaa and Salo
  - Distance travelled by car: From 69 % in Helsinki to 83 and 86 % in the regions of eastern and western Uusimaa and Salo

Vehicle Fleet in Finland

- Nearly **2.8** million passenger cars
  - 70 % powered by petrol
  - 28 % by diesel
  - 1,2 % either petrol or diesel plug-in hybrids
  - 0,4 % gas-fuelled
  - 0,23 % battery electric vehicles

- Average age **12.2** years
- Average scrapping age **21** years
- Yearly average of new registrations **111 882** between 2009-2019
- The growth of new registrations of plug-in hybrids and battery electric vehicles is significant and increasing:
  - 2017: 2,6% (3055)
  - 2019: 6,9% (7863)
  - 1-9/2020: 16,7% (12278)

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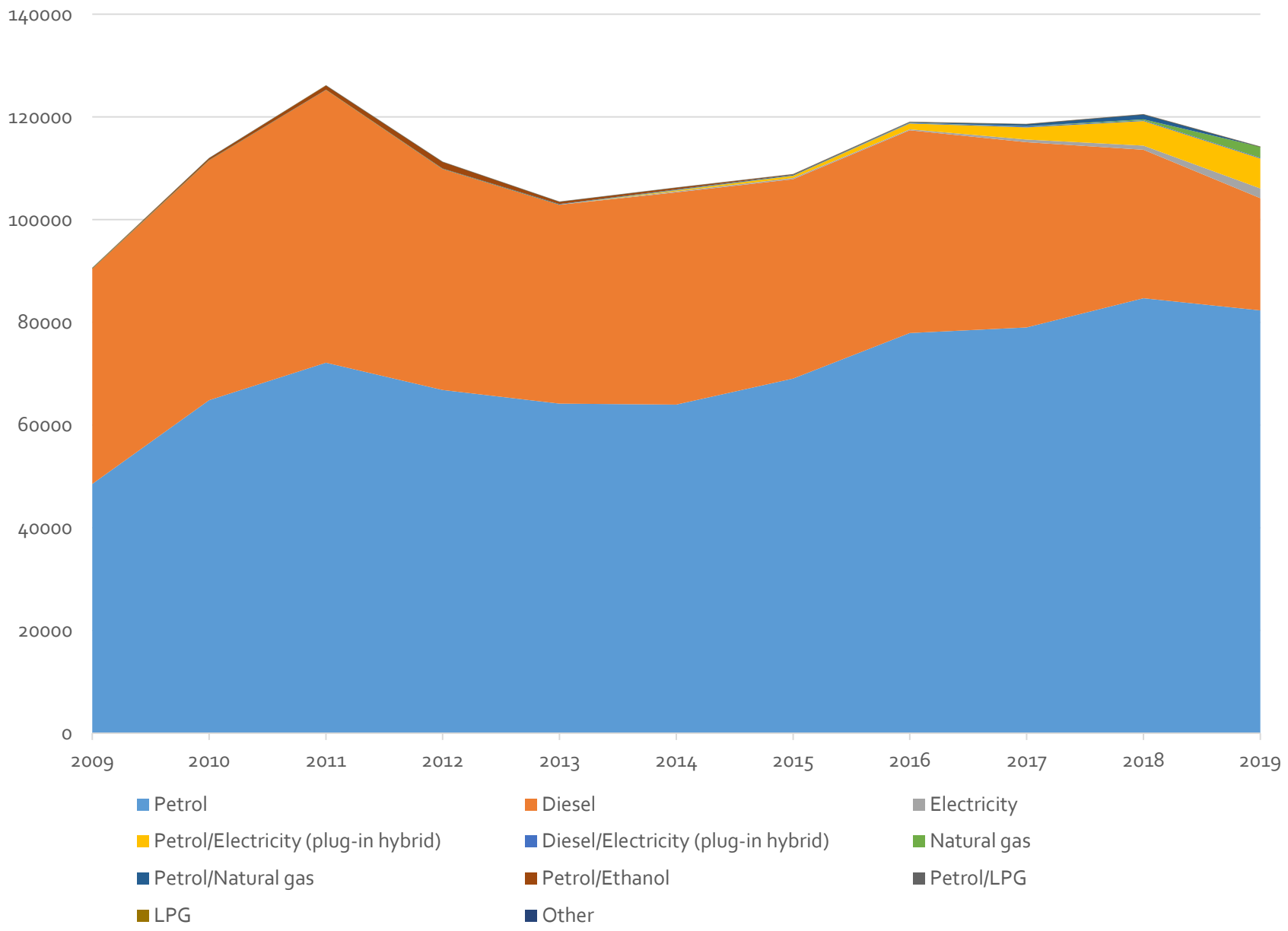
First registrations of passenger cars by driving power



Statistics Finland

3. Towards 2030 and Beyond

Mobility

- Modes of transport
  - People continue to move, even more, and passenger cars are expected to continue as the dominant mode of transportation
  - The number of passenger cars is not expected to grow significantly
  - Public transportation, biking and walking are expected to grow
- Renewal of the vehicle fleet is slow and there are fast gimmicks
  - The rate must be sped up to achieve emission reduction targets and carbon neutrality by 2035
- Multiple disruptions in progress
  - Environmental Crisis
  - Pandemic and The Economic Crisis
  - Digitalization

Alternative Drivetrains and Energy Sources

- Multiple drivetrain options and possible directions
  - For any alternative to succeed, there needs to be an energy source or a fuel that can be used, a vehicle than can use it, and distribution in between
  - If any of these are missing or lacking, the alternative may be unattractive or even unattainable
- Internal combustion engine vehicles are expected to reduce in numbers but remain dominant
- Electric vehicles are expected to grow to 8-30%
- Natural gas vehicles are expected to remain as a small minority
- Fuel cell electric vehicles are not expected to enter the market in numbers

Driving Automation

Level	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Name	**No driving automation**	**Driver assistance**	**Partial driving automation**	**Conditional driving automation**	**High driving automation**	**Full driving automation**
What does the human in the driver's seat have to do?	You are driving whenever these driving support features are engaged – even if your feet are off the pedals and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, break or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
	These are driver support features			**These are automated driving features**		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake / acceleration support to the driver	These features provide steering AND brake / acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless are required conditions are met		This feature can drive the vehicle under all conditions
Example features	Automatic emergency braking, blind spot warning, lane departure warning	Lane centering OR adaptive cruise control	Lane centering AND adaptive cruise control at the same time	Traffic jam chauffeur	Local driverless taxi, pedals / steering wheel may or may not be installed	Same as level 4, but feature can drive everywhere in all conditions

SAE J3016™ Level of driving automation, adapted (SAE 2018, 19; SAE 2019)

Possibilities and Uncertainty

- Technological development brings possibilities and uncertainty
  - Research & Development investments by car manufacturers have increased significantly since 2010
- Alternative powertrains to reduce emissions
  - Avoiding penalties is considered the most important driver
  - Electification is seen as the most viable solution currently
- Automation to increase safety, comfort and productivity
  - Capabilities required for driving automation will increase safety along the way to potentially fully autonomous vehicles
- Digitalization and urbanization change customer expectations and behavior, and create possibilities for new business models

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Thank you!

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4. Workshop topics

1. Service design to tackle uncertainty and knowledge gaps

- Technological development brings possibilities and uncertainty
- New services
  - Understanding technology and new possibilities
  - Understanding and providing best solutions for customer needs
  - Shifting from product sales to lifecycle services
- New business models
  - The attitudes regarding owning are changing
  - The technology is changing
  - For the transition period and beyond

2. Smart specialization, wide range of skills, and continuous learning

- The renewal of the vehicle fleet takes time
  - Passenger cars registered between 2000 and 2010 will be in use in between 2020 and 2030
  - A vehicle registered in 2025 could still be in use in 2045
- Knowledge and skills needed during times of transition are both wide and deep, and need to consider the old, the current and the new technology
  - Generalist and/or Specialists
  - Diversified drivetrains
  - Digital competences and skills
  - Safety and driving automation systems
  - Recycling
  - Infrastructure
- Continuous learning in a constantly evolving domain

3. Passenger Car as a Platform for New Innovations

- Cars for other uses in addition to mobility
  - The transportation of people and goods from one place to another is only one use case
  - Similarly to mobile phones, where calling was the first use case

- For example
  - Real-time monitoring platform
  - Electricity platform
  - Connectivity platform