



Where innovation

*Ben Rutten
Program Manager
Strategic Area
Smart Mobility*

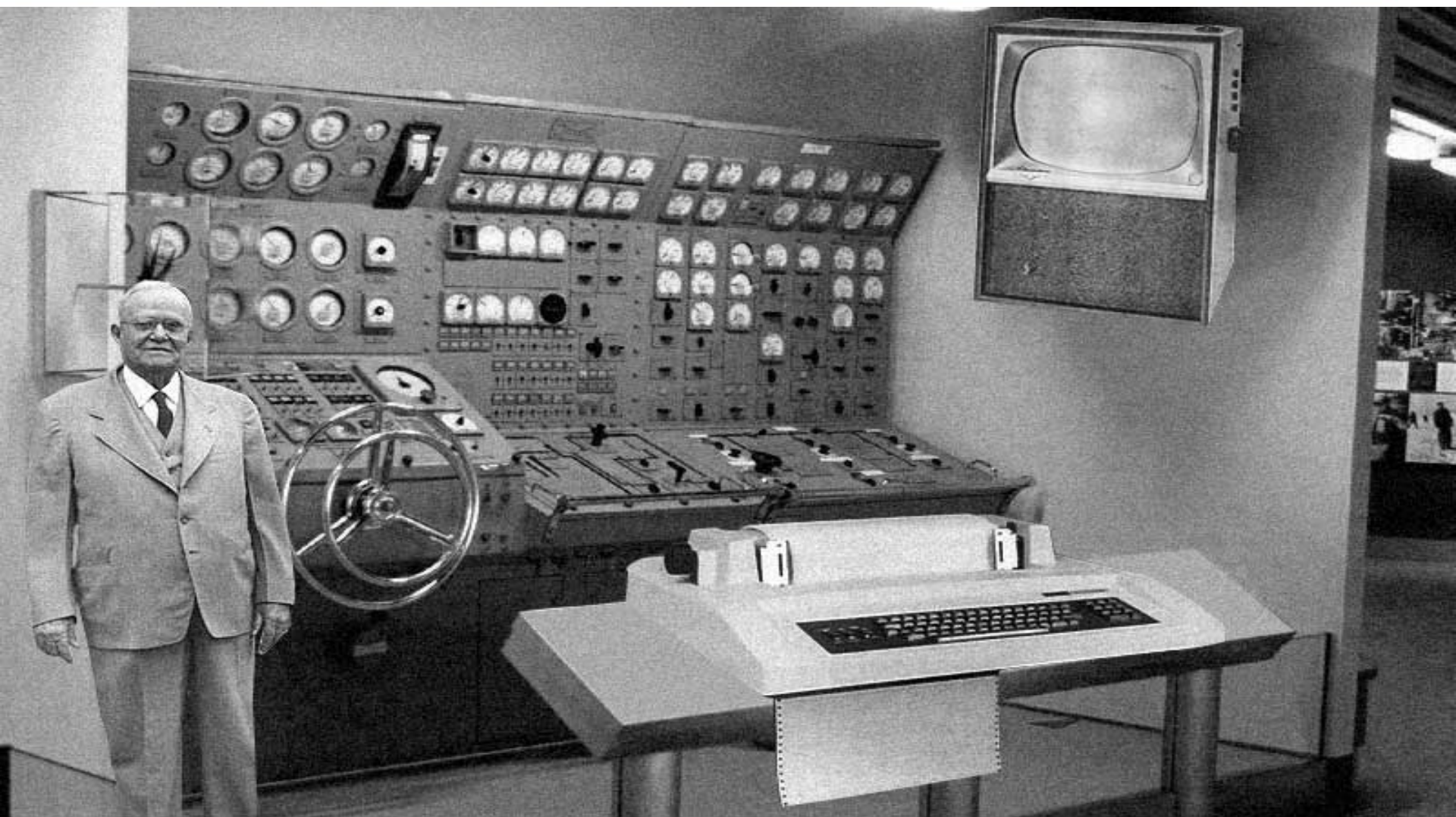
Disrupt or be disrupted

*Changing Business Models for
Sustainable Urban Mobility
ITS a Tool or a Toy?*

Zilina, Nov. 22, 2016

TU/e

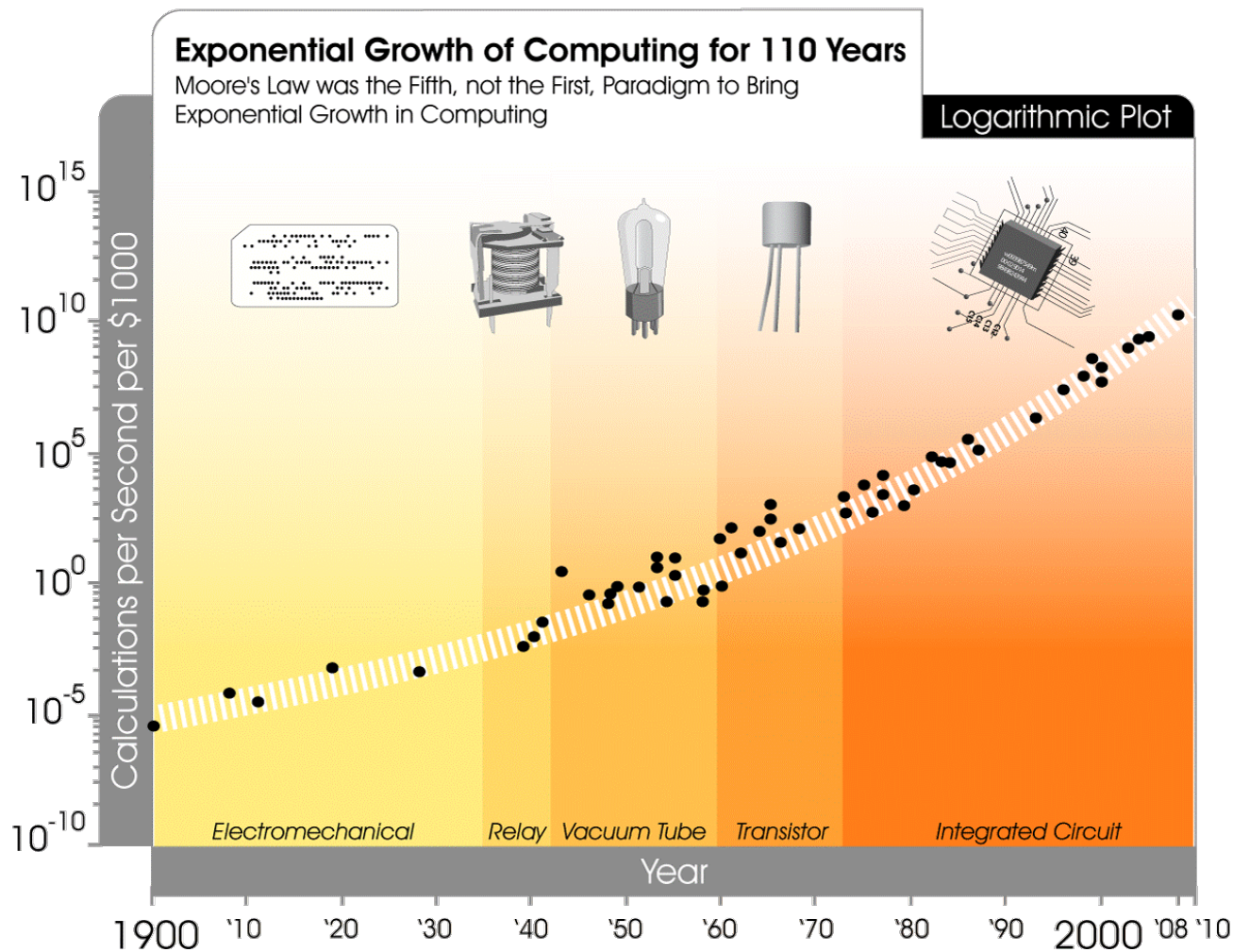
Technische Universiteit
Eindhoven
University of Technology



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use and only

5MB Hard Drive, 1956





Source: Raymond Kurzweil, Kurzweil Accelerating Intelligence

Disruptive Change

Digitize

Disrupt

Dematerialize

Demonetize

Democratize

Printed Encyclopaedia for Sale



Gratis: Winkler Prins encyclopedie, 3-delig

Gratis, of voor een bloemetje, af te halen: complete winkler prins encyclopedie bestaande uit 3 delen.

Gratis Marjo

06 nov. '14 Amsterdam, NH
119 km

Gelezen | Ophalen



Winkler Prins encyclopedie

In verband met verhuizing: gratis af te halen!

Bieden Steffers

06 nov. '14 Cuijk, NB
36 km

Zo goed als nieuw | Ophalen



Gratis af te halen

Gratis af te halen: encyclopedie winkler prins, 18 boeken en een supplement. Destijds deel voor deel bijeengespaard. Banden zijn nog ... ▼

Gratis johanna

06 nov. '14 Veenendaal, UT
71 km

Gelezen | Ophalen



Gratis Winkler encyclopedie 6e druk

Gratis af te halen, 20 delig plus supplement register plus jaarboeken 1951, 1952, 1953

Bieden Fleur

06 nov. '14 Loosdrecht, NH
98 km

Gelezen | Ophalen



Gratis encyclopedie zgan

Gratis af te halen een zo goed als nieuwe encyclopedie 24 delen.

Gratis Hans

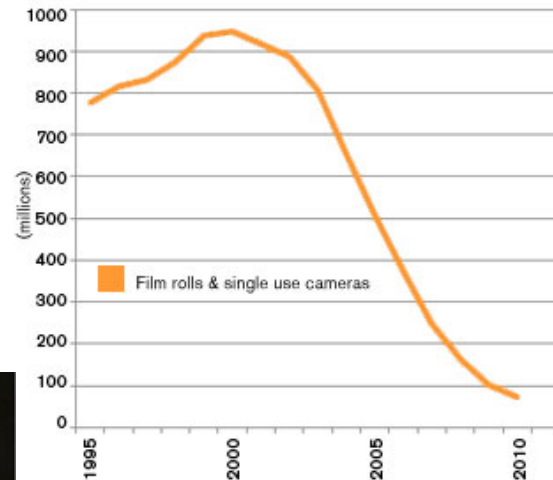
06 nov. '14 Delft, ZH
115 km

The Kodak Case “We do the Rest”

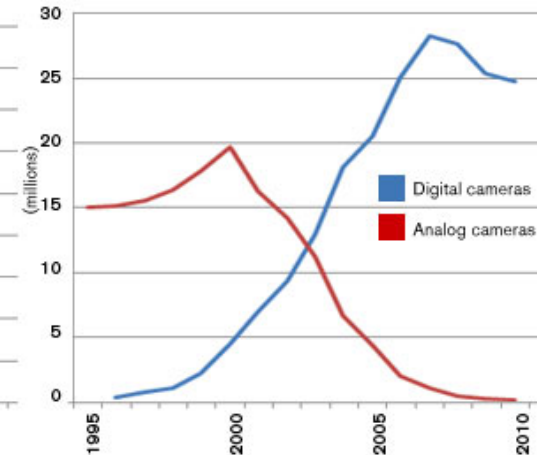


Decline of Film

Film rolls sold



Camera sales



In 1997, stock market valued Kodak at over **\$30 billion**

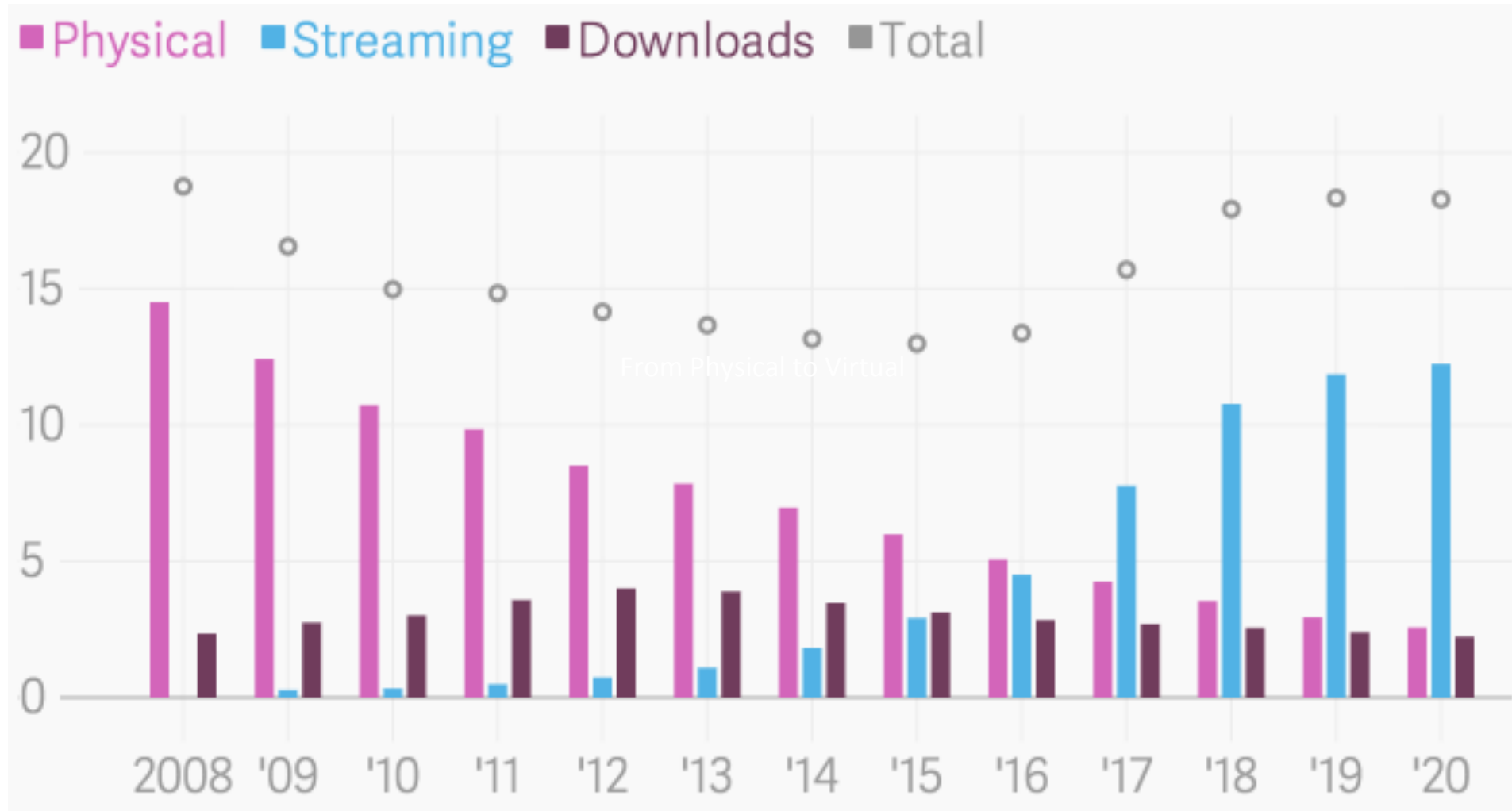
In 2011 Kodak is worth only **\$265 million**

The wages of disruption: North of Stockholm, Sweden, a Kodak film finishing facility lies in ruin. Kodak opened operations here in 1967 and shuttered the site in 2000.

From Physical to Virtual



From Physical to Virtual



The Car has become a Computer on Wheels



- *A modern car produces 100Tb data per hour*
- *The new Mercedes S-Class has more ECU's and 100x more lines of software code compared to a Boeing 747*
- *The vehicle starts outsmarting the driver. After ESP and ABS, more and more functions are taken over by the vehicle*

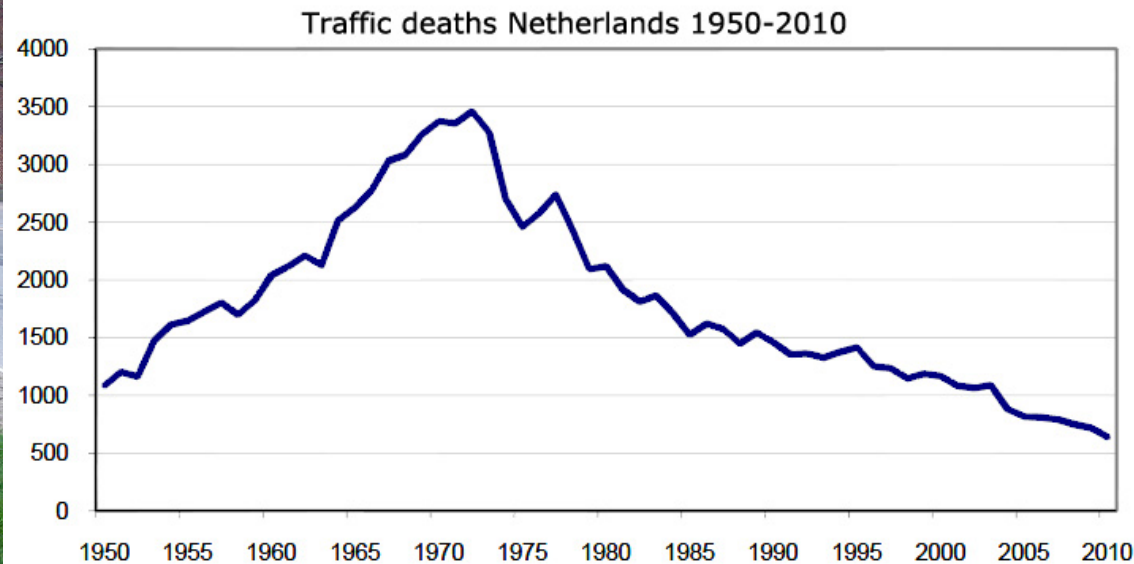


*Smart Mobility: Cars using ICT
are solving their own problems*

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Traffic Death in the Netherlands 1950-2010



- Less and less accidents caused by traditional traffic offenses; driver distraction is the new enemy
- Volvo: “no one will be killed or injured in a new Volvo by 2020”
- >90% of car accidents caused by human error. Still huge potential in car-technology: connected cars, Advanced Driver Assistance Systems (up to autonomous driving)

ADAS and vehicle automation

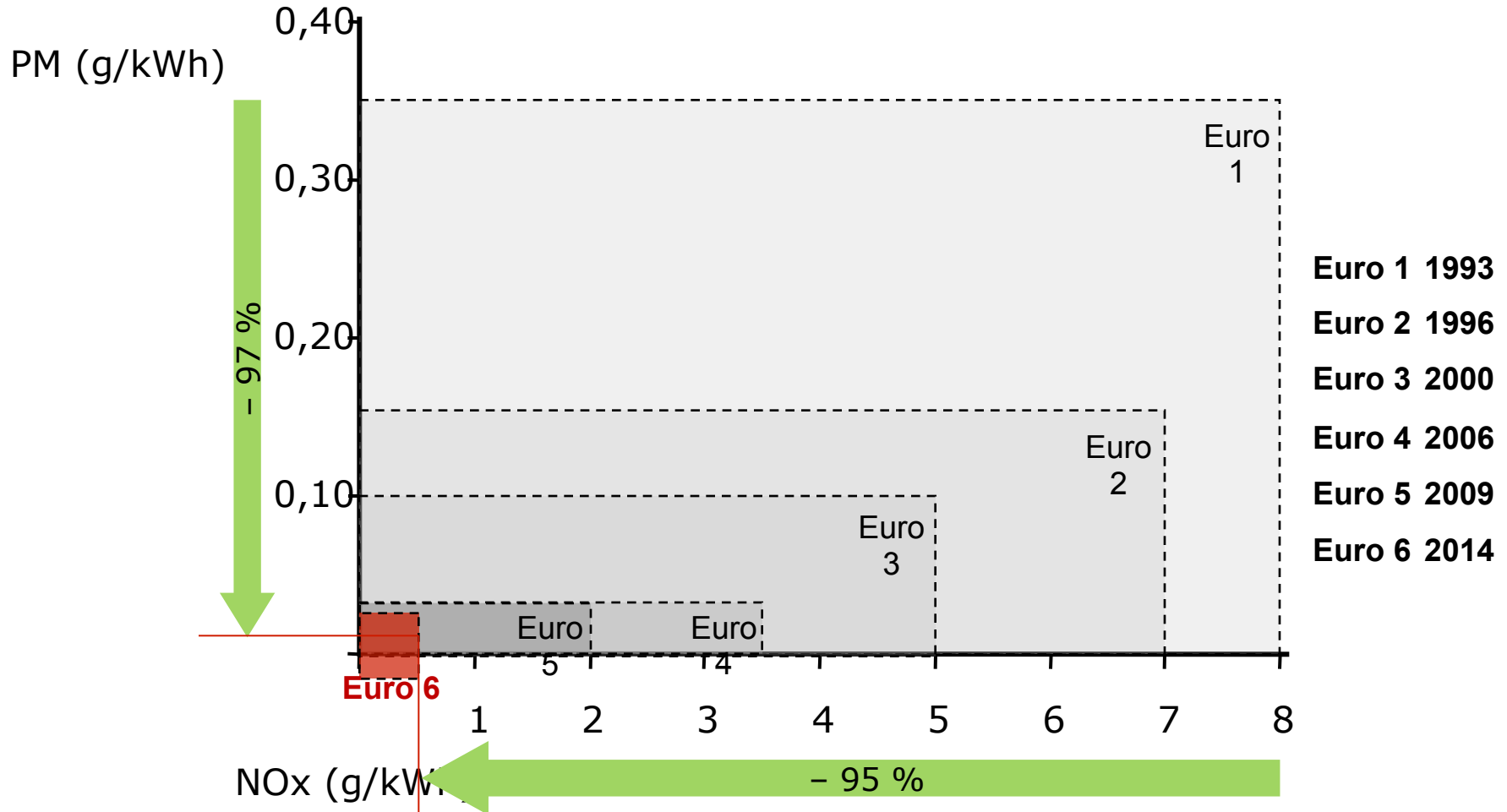




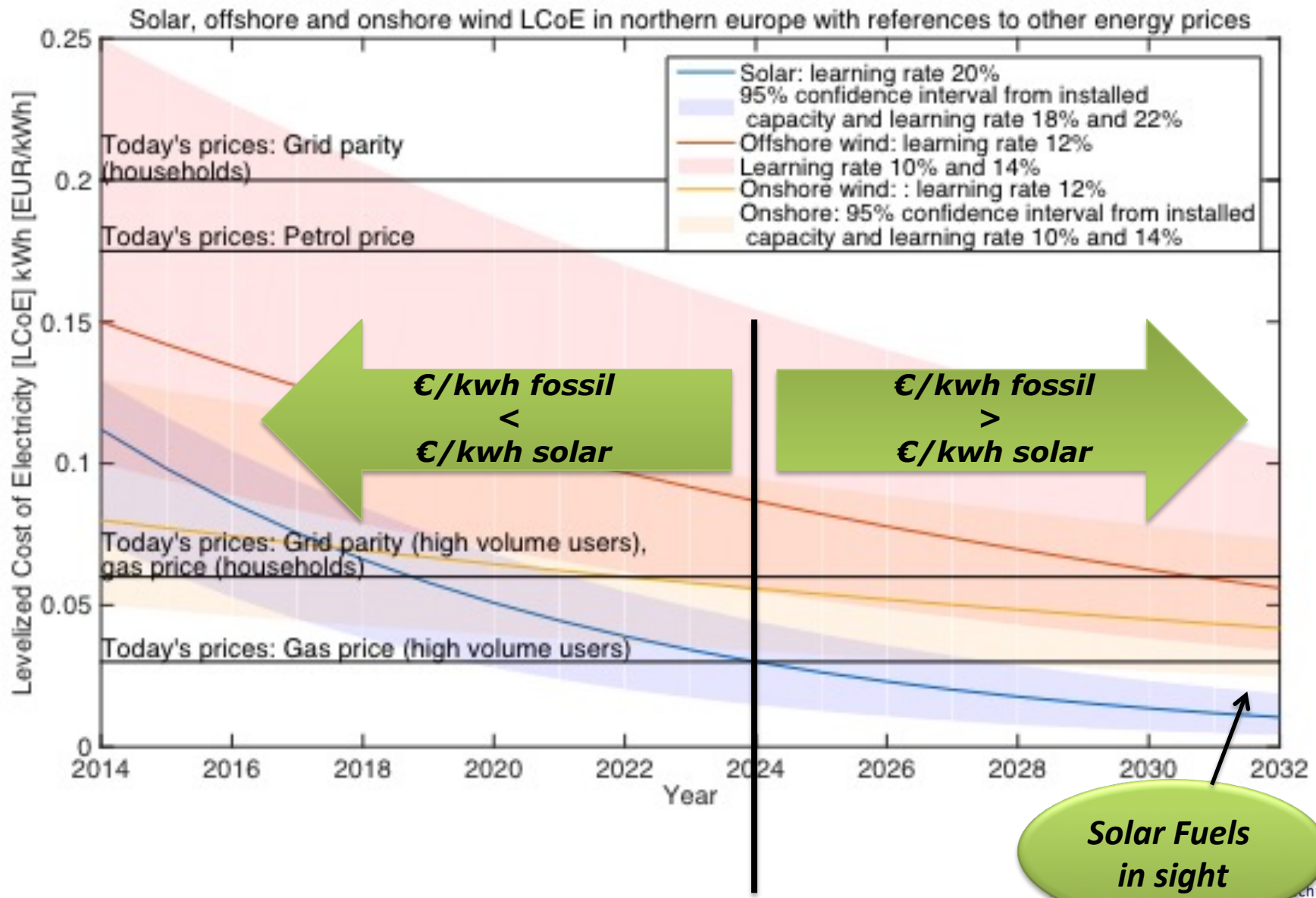




Emission Legislation

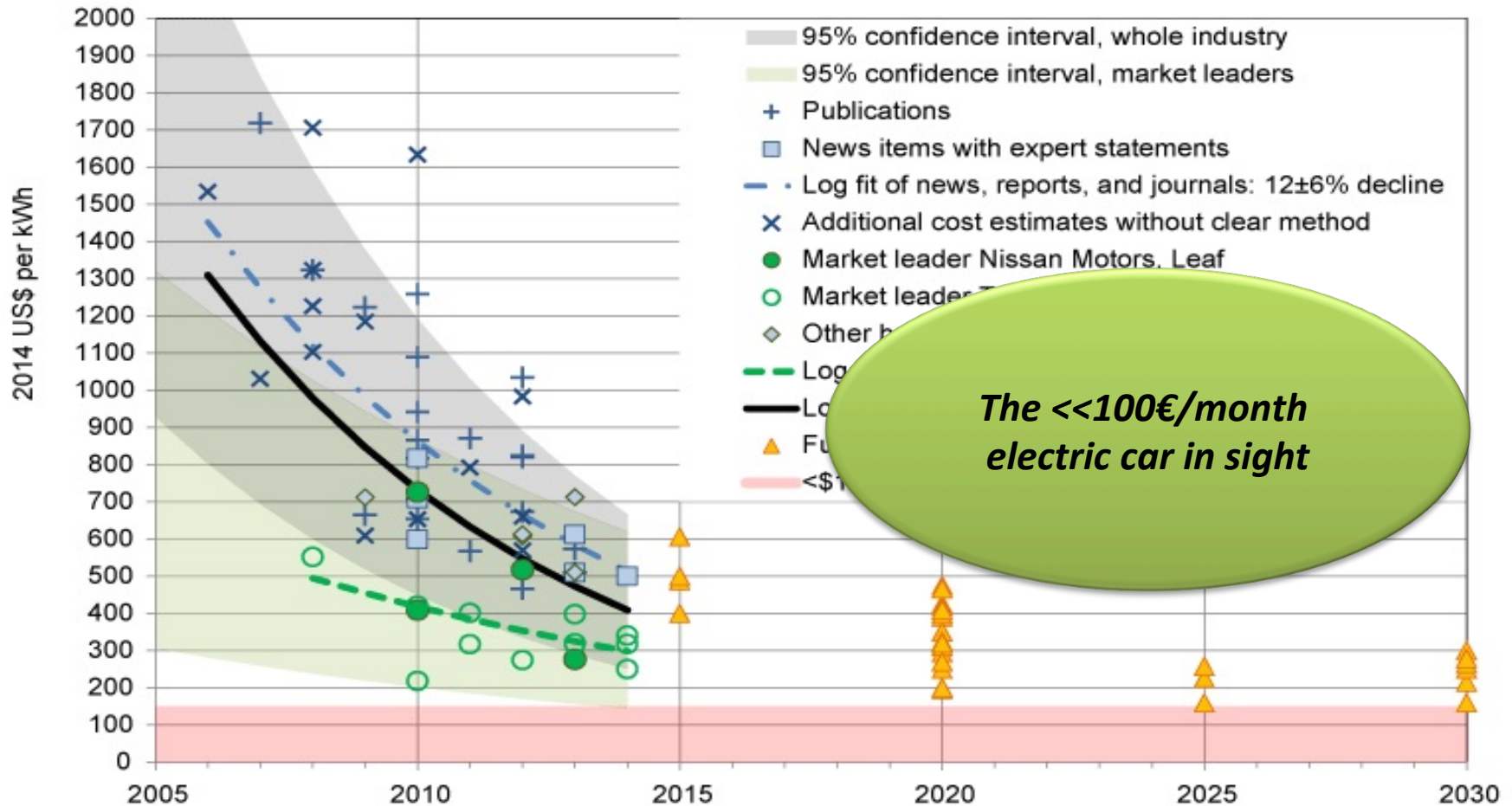


The Solar Future



Cheap Batteries will drive EV Market

Estimates of costs of lithium-ion batteries for use in electric vehicles



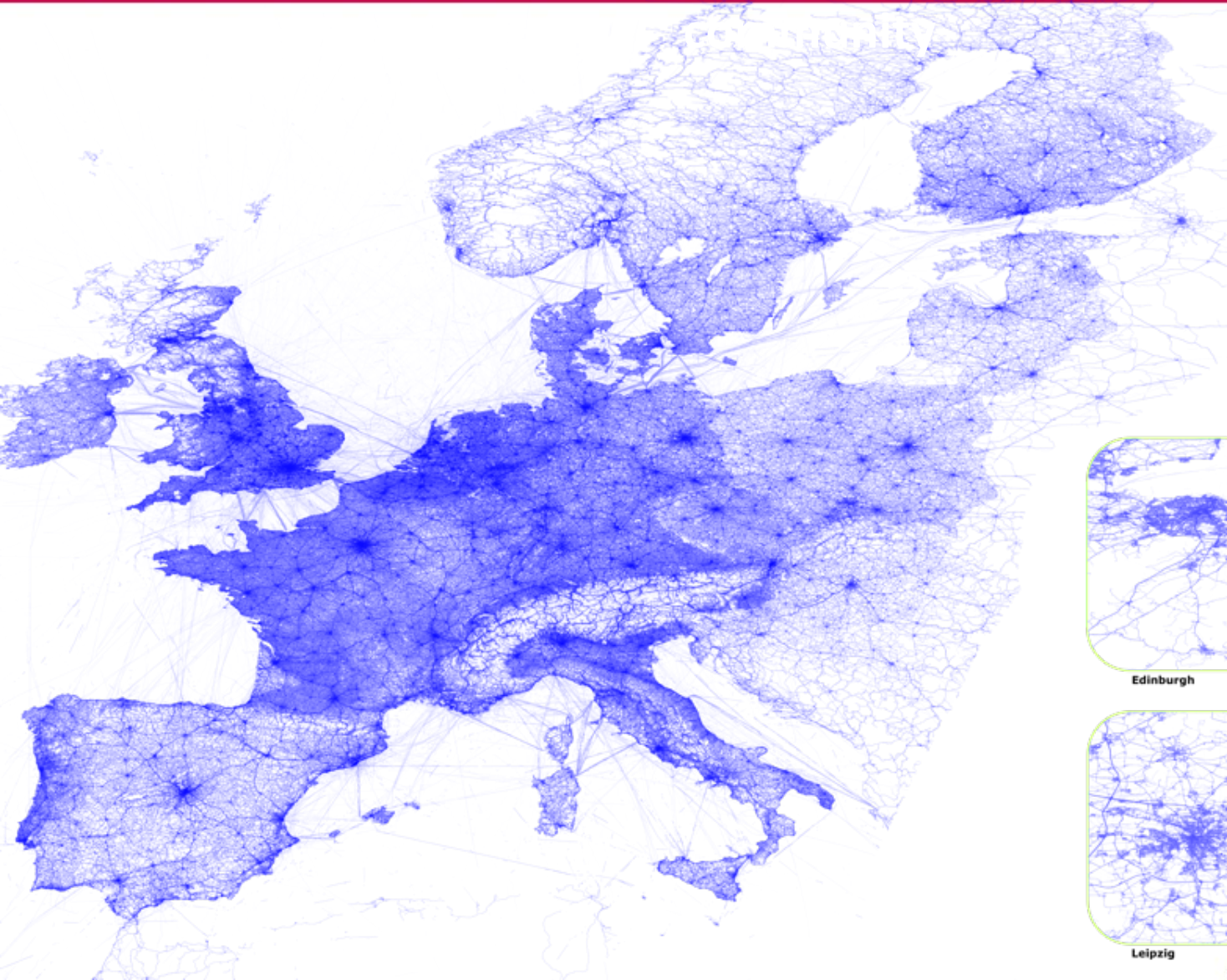
Björn Nykvist and Måns Nilsson, 2015

The Car as the Future Big Data Provider

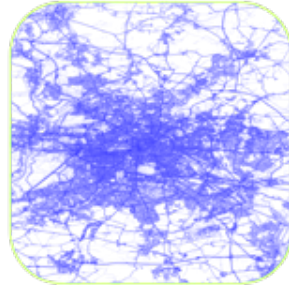


TomTom's Floating Car Data

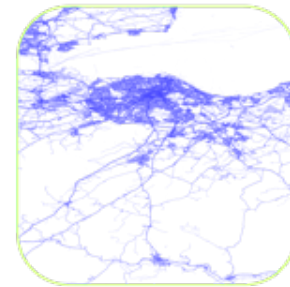
Anonymous Location and Speed Information by TomTom



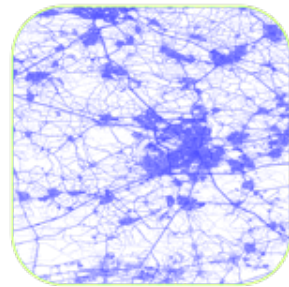
Amsterdam



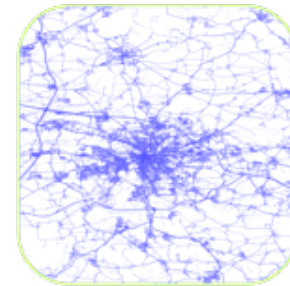
Berlin



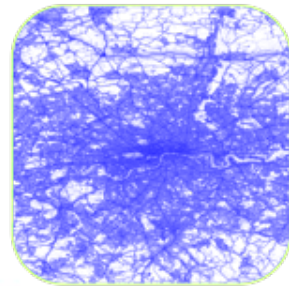
Edinburgh



Eindhoven



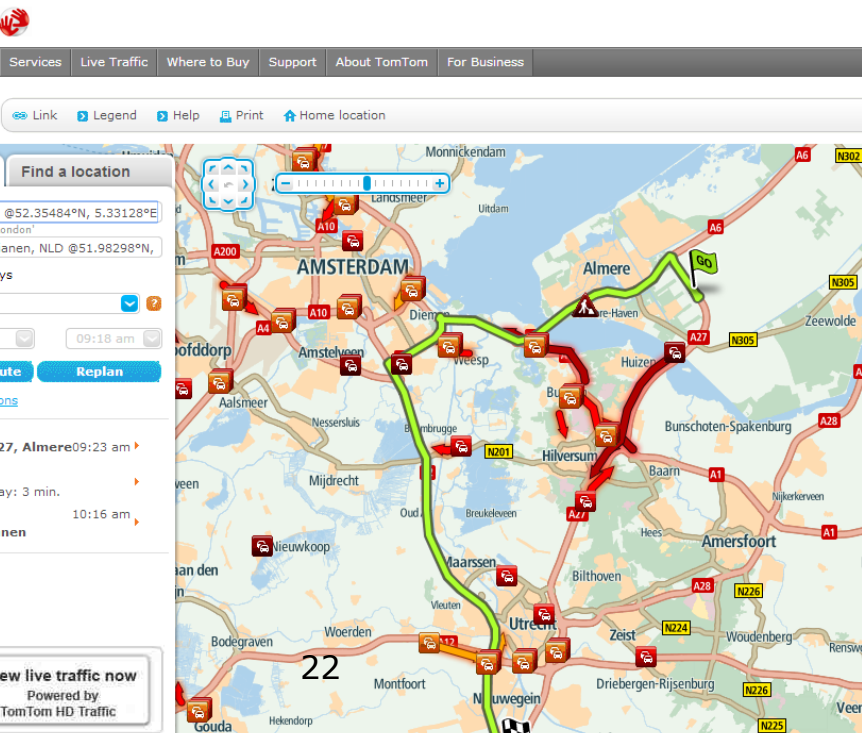
Leipzig



London

Traffic management 2.0

- Traffic will be a self-steering system of well-informed individuals. Governments will have to make a shift from managing traffic to facilitating traffic.
- Traffic jams are a voluntary and predictable event.
- Cost of congestion decreases as drivers can use time effectively
- Smart Cars flourish well on simplified infrastructure



ICT enabled disruption → zero external costs



Safety:	1,8	- 2,3 % GDP → 0% GDP
Environment:	0,3	- 1,4 % GDP → 0% GDP
Congestion:	0,9	- 1,2 % GDP → 0% GDP
<hr/>		
TOTAL:	3,0	- 4,9 % GDP → 0% GDP

On-demand “Taxi” Systems



MaaS is promising a lot



Urban commuter package for 95 € month:

- Free public transport in home city area
- Up to 100 km free taxi
- Up to 500 km rental car
- Domestic public transport 1500 km



15 minutes package for 135 €/ month:

- 15 minutes from call to pick up by shared taxi
- EU wide roaming for shared taxi at 0,5 €/km
- Free public transport in home city,
- Domestic public transport 1500 km



Business world package for 800 €/month:

- 5 minutes pickup in all EU
- Free taxi in home city
- Lease car and road use
- Taxi roaming worldwide

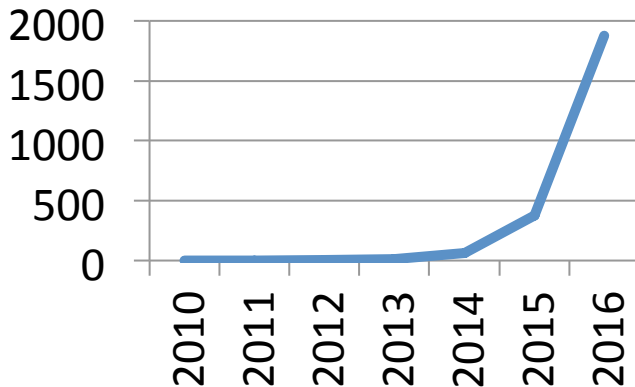
Family package for 1 200 €/month:

- Lease car and road use
- Shared taxi for all family with 15 minutes pickup
- Home city public transport for all
- Domestic public transport 2 500 km



From car sharing/riding to MaaS?

Uber # rides [million]



subscribers

- BlaBlaCar (SNCF) 1 million
- Drivy + Ouicar 1,5 million
- Car2Go (Daimler) 2 million
- DriveNow (BMW) 0,5 million
- Waze (Google)
- Didi (Apple stake)

Startups first, OEM's follow now at high pace

Tech giants Google, Apple into Maas?



Students & triple helix cooperation

- Facilitating bottom up initiatives by students
- Intrinsic motivated for sustainable development
- Out-of-the-box smart thinking
- High pace development
- Part of TU/e sponsorship = financial compensation of 1 year study standstill
- Sponsor/cooperation by companies & authorities
- Sponsors benefit from student projects:
 - Talents, new ideas/results, PR & recognition

TU/e Smart Mobility Living Lab



TU/e Storm 80DR student team



TU/e Storm 80DR student team

Acceleration (0-100 km/h) 5.0 seconds

Top speed 160 km/h

Range 380 km

Weight (Touring) 340 kg

Weight (Empty) 160 kg

Power (Maximum) 70 kW

Torque (Maximum) 240 Nm

Mainframe Self-developed aluminium sheet frame

Battery technology Lithium-ion

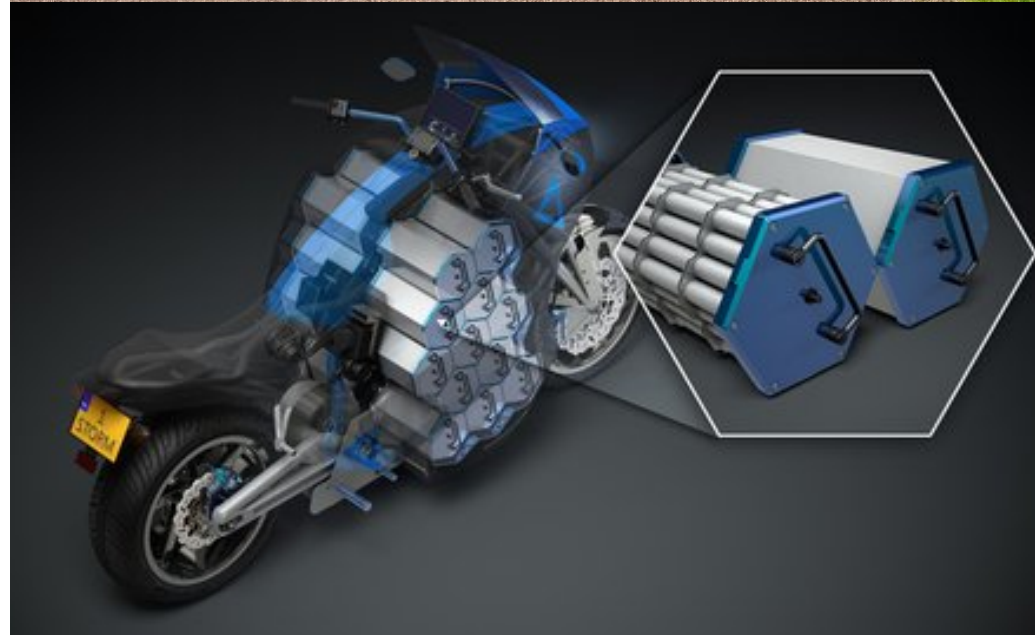
Capacity (Touring) 28.5 kWh

Cartridges (Touring) 24

Swapping time 7 minutes

Charging time 8 hours

Fastcharging time (0-80%) 38 minutes



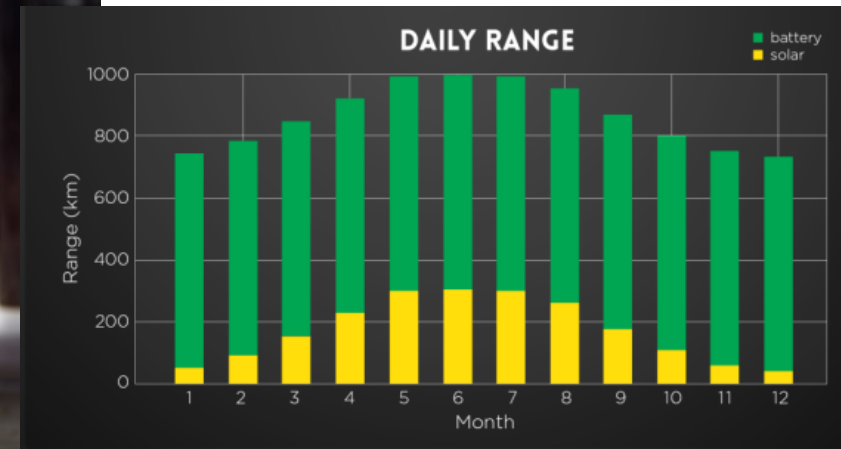
Stella Lux, Energy Positive Family Car

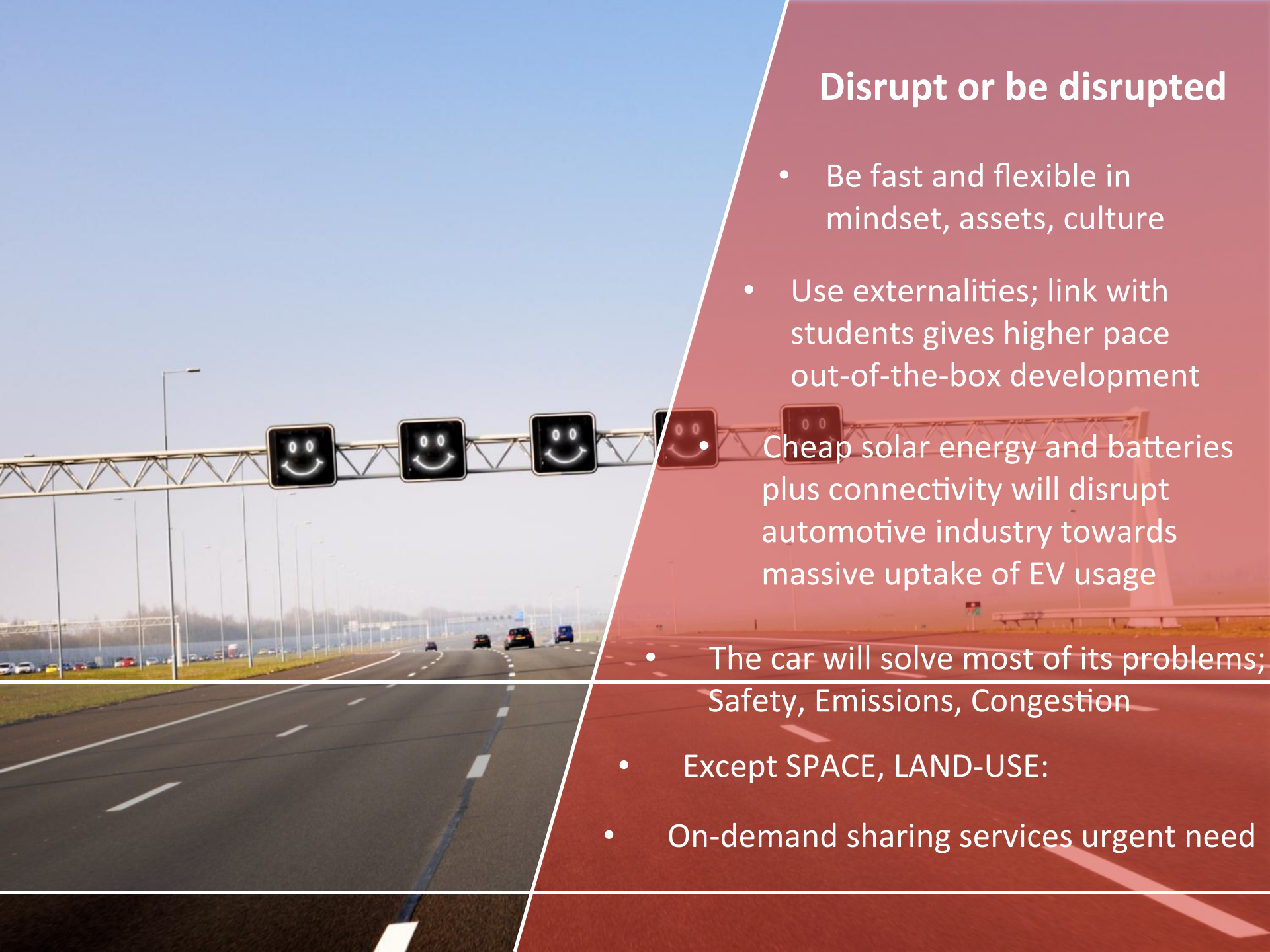
Winner

World Solar Challenge

2013 and 2015

1500 km on a single charge





Disrupt or be disrupted

- Be fast and flexible in mindset, assets, culture
- Use externalities; link with students gives higher pace out-of-the-box development
- Cheap solar energy and batteries plus connectivity will disrupt automotive industry towards massive uptake of EV usage
- The car will solve most of its problems; Safety, Emissions, Congestion
- Except SPACE, LAND-USE:
- On-demand sharing services urgent need



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