futurefuel strategies

Future Fuel Outlook Service Member Web Conference

Perspectives on the New Mobility: Sharing

June 2019

Our Speakers Today

Dr. Tom Voege

Transport Policy Expert

Anders Wall

Chief International Officer

GreenMobility A/S

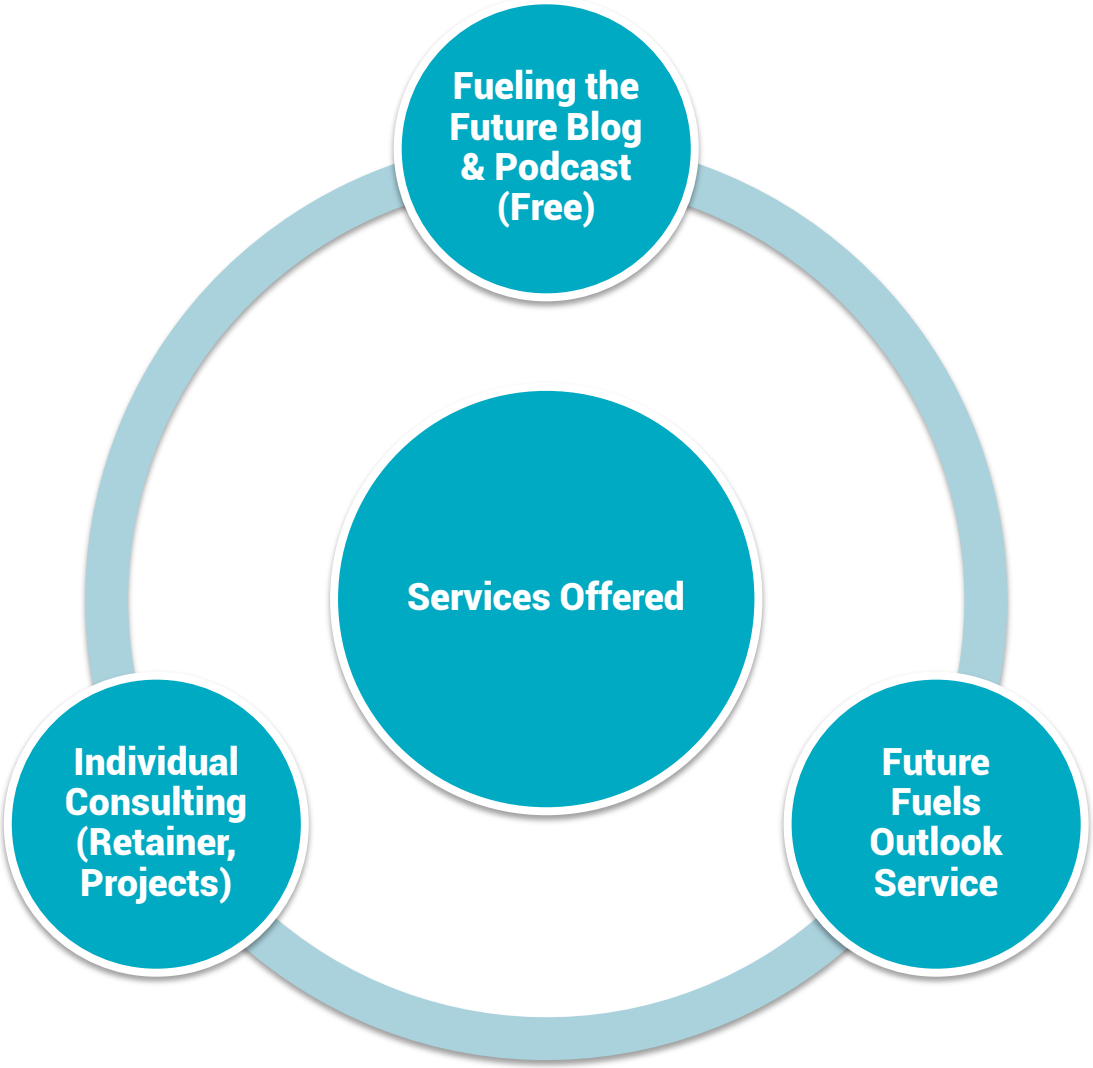
Greg Rogers

Director, Government Affairs and Mobility Innovation

Securing America's Energy Future

What Is Future Fuel Strategies?

A consultancy that takes a 360° view of future fuels issues, trends and developments



Macro Trends I Watch for Clients

I leverage my global network to bring intelligence to clients and doing first-rate research and analysis that integrates these issues holistically

The Drivers

The collected works on all these topics are easily accessible here for clients

- Air Pollution
- Climate Change
- Urbanization
- Demographics

Legislative & Regulatory Frameworks

- Fuel economy
- ZEV
- Low carbon fuels
- "Car bans"

Key Topics

- Biofuels & Adv. Alt. Fuels
- Fuel Economy
- ZEVs
- Autonomy
- Mobility

The Future of Transportation

Latin America and Caribbean

Future Fuel Web Conference "Perspectives on New Mobility: Sharing“, 3rd of June 2019

Dr. Tom Voege

Transport Policy Expert

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Global tech and service trends

Industry-wide:

- *The Sharing Economy*
- *Disruptive Innovation*
- *Big Data Analytics*

Transport sector:

- *Early TNC business models*
- *Current ride-hailing platforms*
- *Smart service scheduling*

- *Modal integration (MaaS)*
- *New modes (e.g. scooters)*
- *Shared mobility concepts*

Key transport technology trends

Autonomous, **C**onnected, **E**lectrified, and **S**hared (ACES)

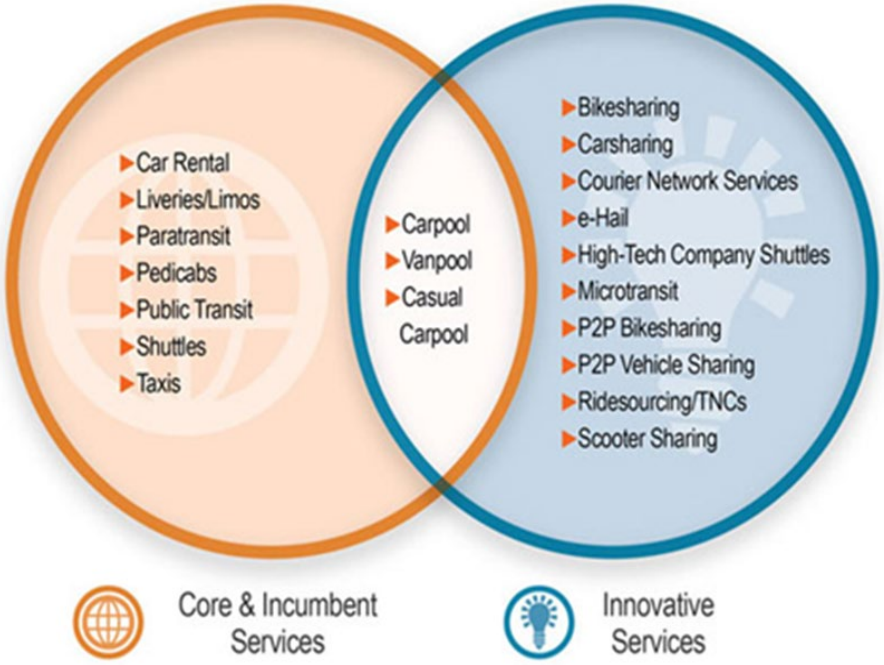
The ACES concept in transport

- **A = Autonomous:** road safety add on in private cars or enabling robo-taxis or shared mobility
- **C = Connected:** V2V or V2I connectivity, either as a warning system or backbone for fleets
- **E = Electrified:** full automation likely in parallel with electrification, charging infrastructure
- **S = Shared:** sharing of vehicles, as well as sharing of ownership and of the access to vehicles

Characterising mobility services

	Traditional mobility solutions	New mobility services	
Individual-based mobility	Private car ownership	Car sharing: peer-to-peer	A platform, where individuals can rent out private vehicles when they are not in use
	Rental cars	Car sharing: fleet operator	On-demand short term car rentals with vehicle owned and managed by fleet operator
Group-based mobility	Public transport: group mobility	On-demand private shuttle	App and technology enabled, cheaper than taxi, more convenient than public transport
	Public transport: mass transit	Private buses	Use of shared commuter bus fleets available to the public or to employees of companies

Overview of shared mobility



Key benefits include:

- *Last mile/ first mile solutions*
- *Reduce traffic congestion*
- *Mitigate forms of pollution*
- *Reduce transportation costs*
- *Improve efficiency*
- *Choices for no access to car*
- *Mobility options for disabled*

Range of shared mobility services

Taxonomy for Terms Related to Shared Mobility and Enabling Technologies	
Bike-sharing: on-demand access to bicycles at variety of pick-up/ drop-off locations for one-way or roundtrip	**Ride-sharing:** formal/ informal sharing of rides between driver and passenger with similar origin-destination pairings
Car-sharing: offers members access to vehicles by joining an organisation that provides and maintains a fleet of cars	**Ride-sourcing:** on-demand transport service prearranged for compensation, driver and passenger connect via apps
Micro-transit: transit service that uses multi-passenger/ pooled shuttle for on-demand or fixed-schedule services	**Scooter-sharing:** access to scooters by joining an organisation that maintains a fleet of scooters at various locations

Mobility services and adoption

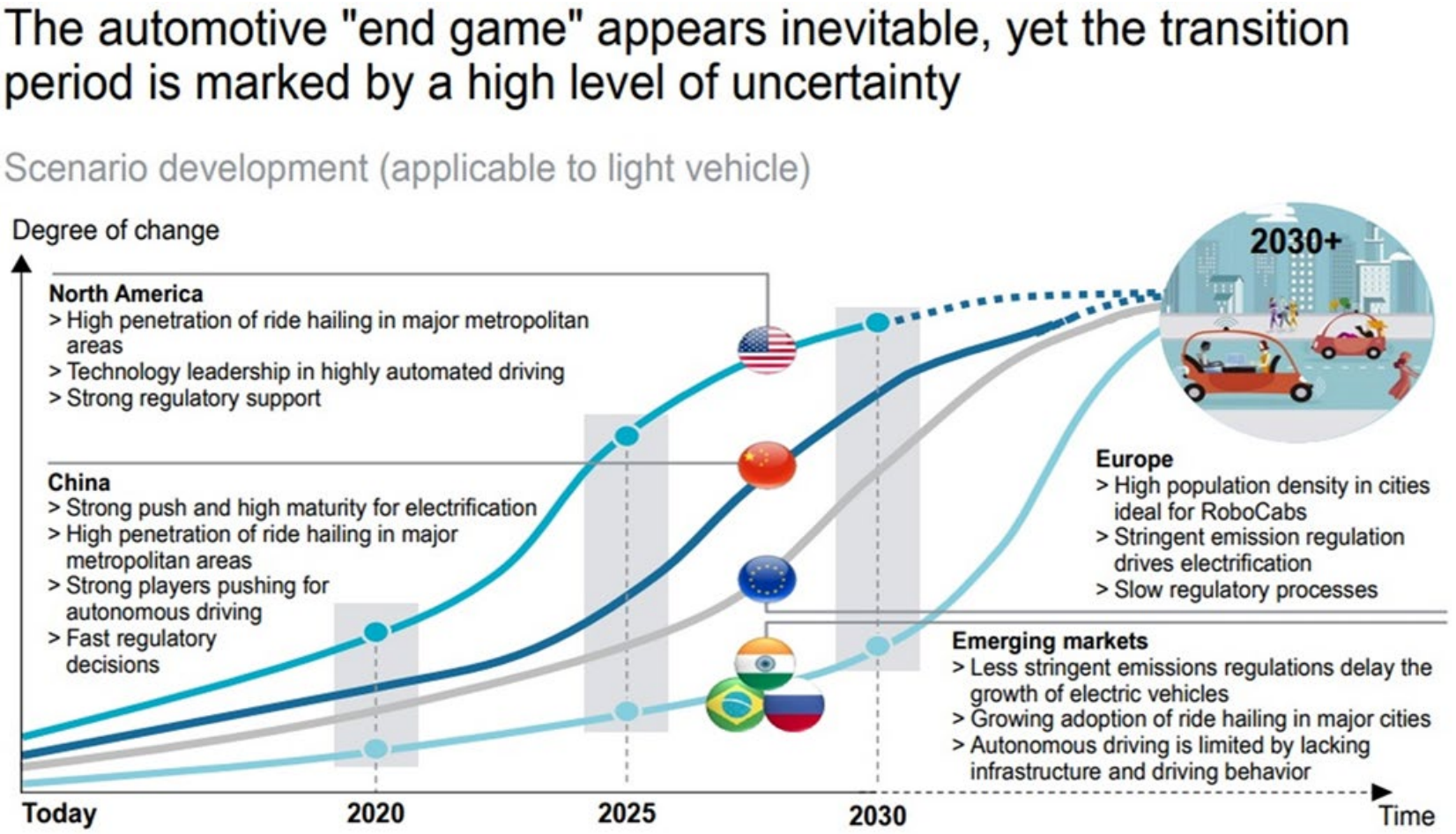
e-Scooters

Ride-hailing

Bike-sharing

Car-sharing

Regional variability of tech uptake



Policy stakeholders and roles

Level	Actors	Role
Strategic (Long term)	National Government	• Legal framework • National transport policy • Financial support local government
	Local Government	• Transport policy • Budget and fare policy • Local regulations
Tactical (Medium term)	Transport Authority	• Network and service levels • Contracting operators • Ticketing system • Information and marketing • Investments in infrastructure
Operational (Short term)	Transport Operators	• Transport operation • Investments in rolling stock • Customer services

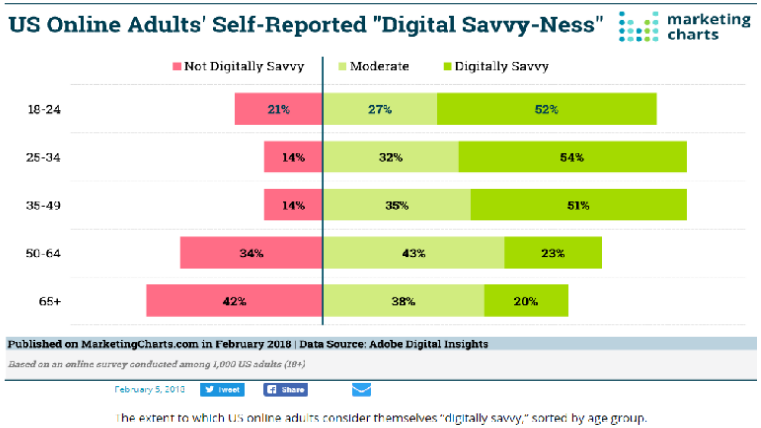
Main government responses

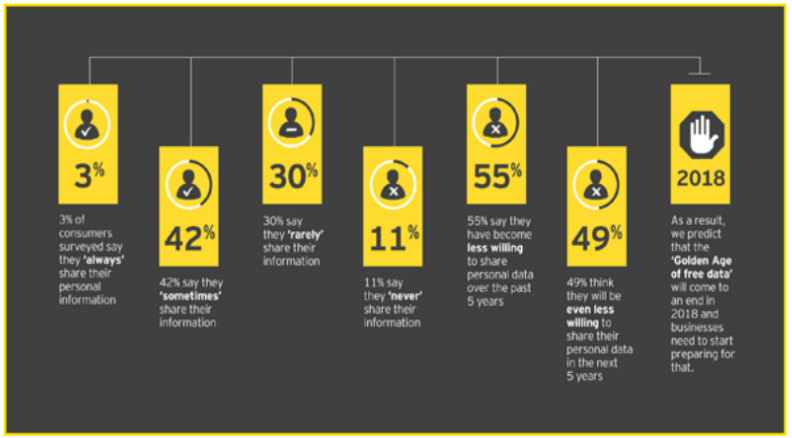
- Use of taxes and other pricing policy mechanisms
  - Including transport externalities (environment)
  - Loss of income from fuel tax from move to EVs
  - More sharing and use of clean vehicles and fuels
- Land-use, infrastructure, and integrated policies
  - Managing parking and curb access for vehicles
  - HOV/ shard mobility lanes and AV infrastructure
  - Access control and EV charging infrastructure

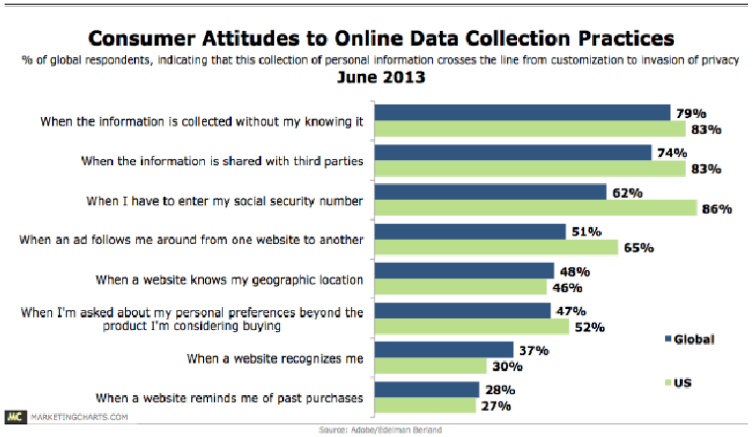
Specific issues in the region

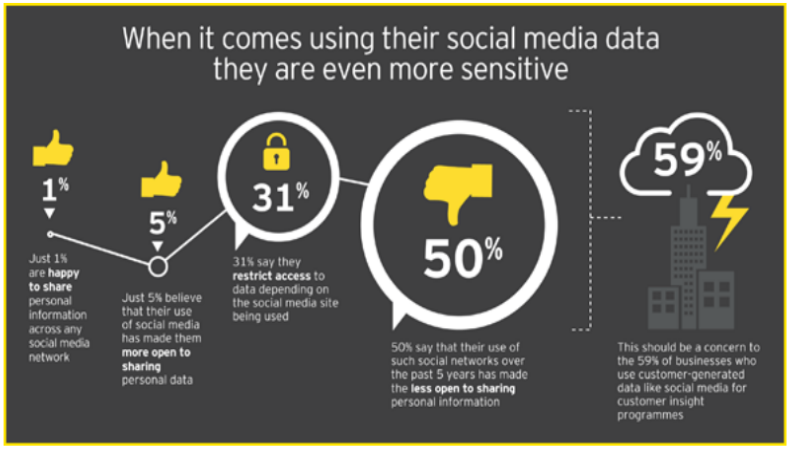
- Potential pushback from car manufacturers due to additional costs from automation and safety features
- Potential pushback from truck drivers due to concerns of labour market effects of HGV automation
- Societal factors such a car still seen as an aspirational status symbol are counteracting service adoption
- Vehicle fleet compositions, vehicle age and fleet renewal rates, road safety, and environmental issues

Selected statistics on data & tech



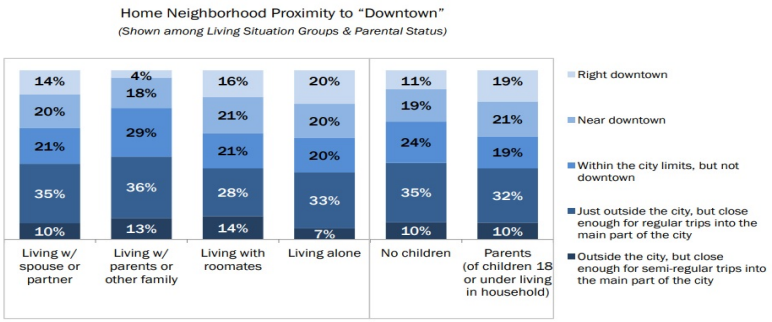




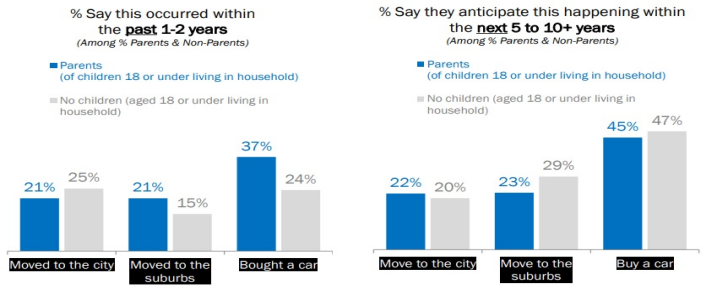


Selected statistics on millennials

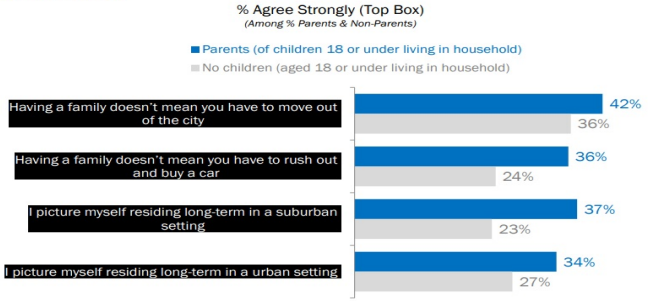
Those who live alone or are parents living with children are most likely to live in or near "downtown".



Millennials who are parents were more likely to have bought a car, but only slightly more likely to have moved to suburbs than non-parents.



On an attitudinal level, Millennial parents may be more likely to feel freedom in options for how they'd like to live – with or without a car, in an urban or suburban environment.



Millennial parents may be more likely to "opt-in" to car ownership – as part of a multi-modal strategy to have options for getting around.

	Parents (have kids under 18 living in household)	Do NOT have kids
Q16 - How often do you use more than one transportation option for getting to a destination?		
n=	374	626
% Use more than one transportation option for getting to a destination **daily**	**43%**	**33%**
S10 - How many cars are owned by people in your household, including yourself?		
n=	374	626
Mean # of cars owned in household	**1.70**	**1.46**
Q19 - Which of these describe how your car fits into your transportation routine? (Asked among car owners)		
n=	253	347
I can't get to the places I need to without a car (at least some of the time)	**27%**	**36%**

Millennial parents are more likely to be using multiple transportation options on a daily basis.

They're more likely to have multiple cars in their household, but interestingly, among car owners, Millennial parents were *less* likely to feel they *have* to have a car to get to the places they need to.

Selected LAC transport statistics

Figure 3. Registered motor vehicles per 1,000 population in the Region of the Americas, by country, 2010

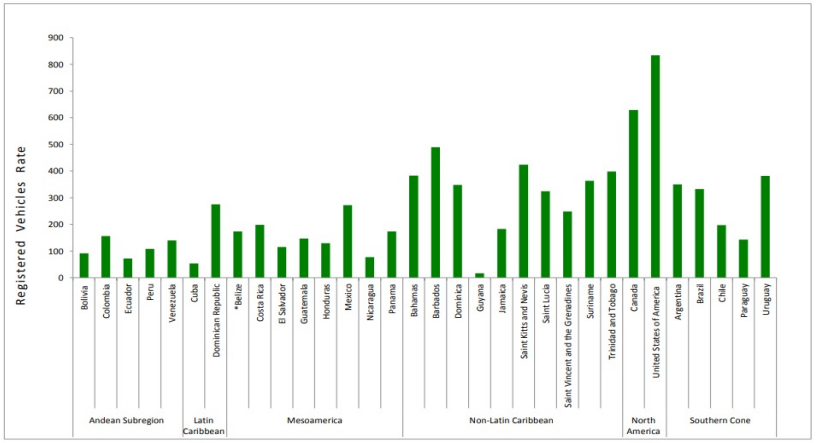


Figure 6. Proportion of reported road traffic deaths in the Region of the Americas, by type of road user and subregion, 2010

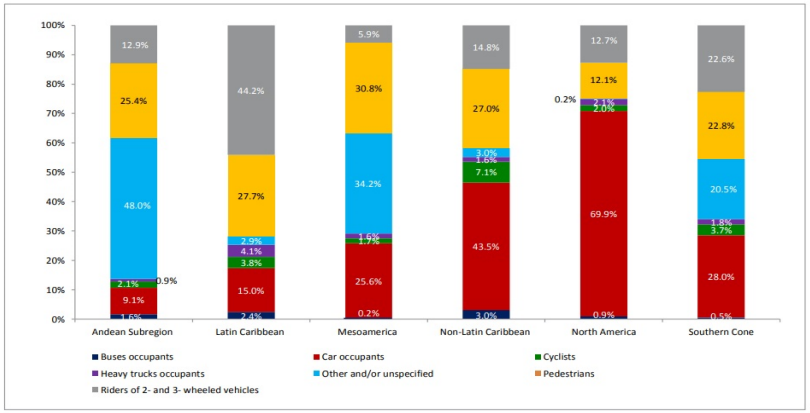


Figure 4. Types of registered vehicles in the Region of the Americas, by subregion, 2010

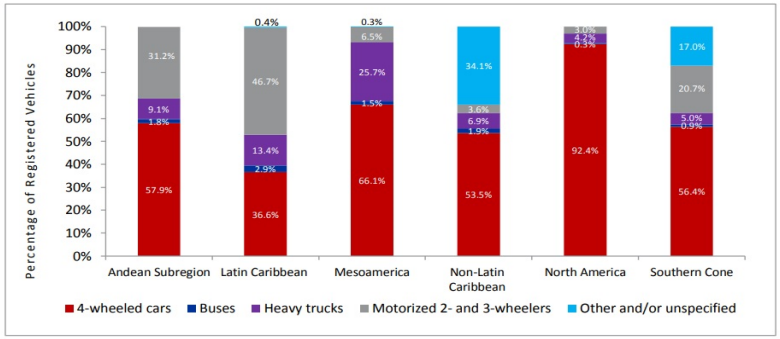
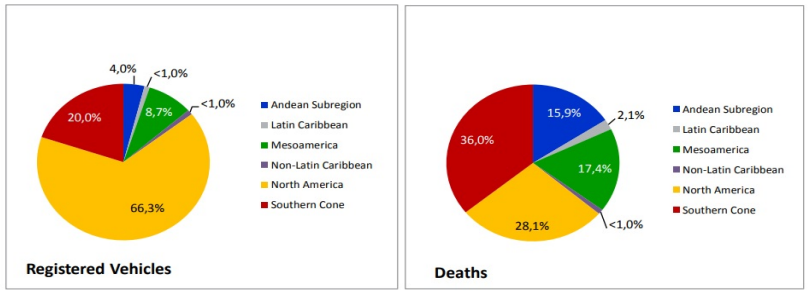
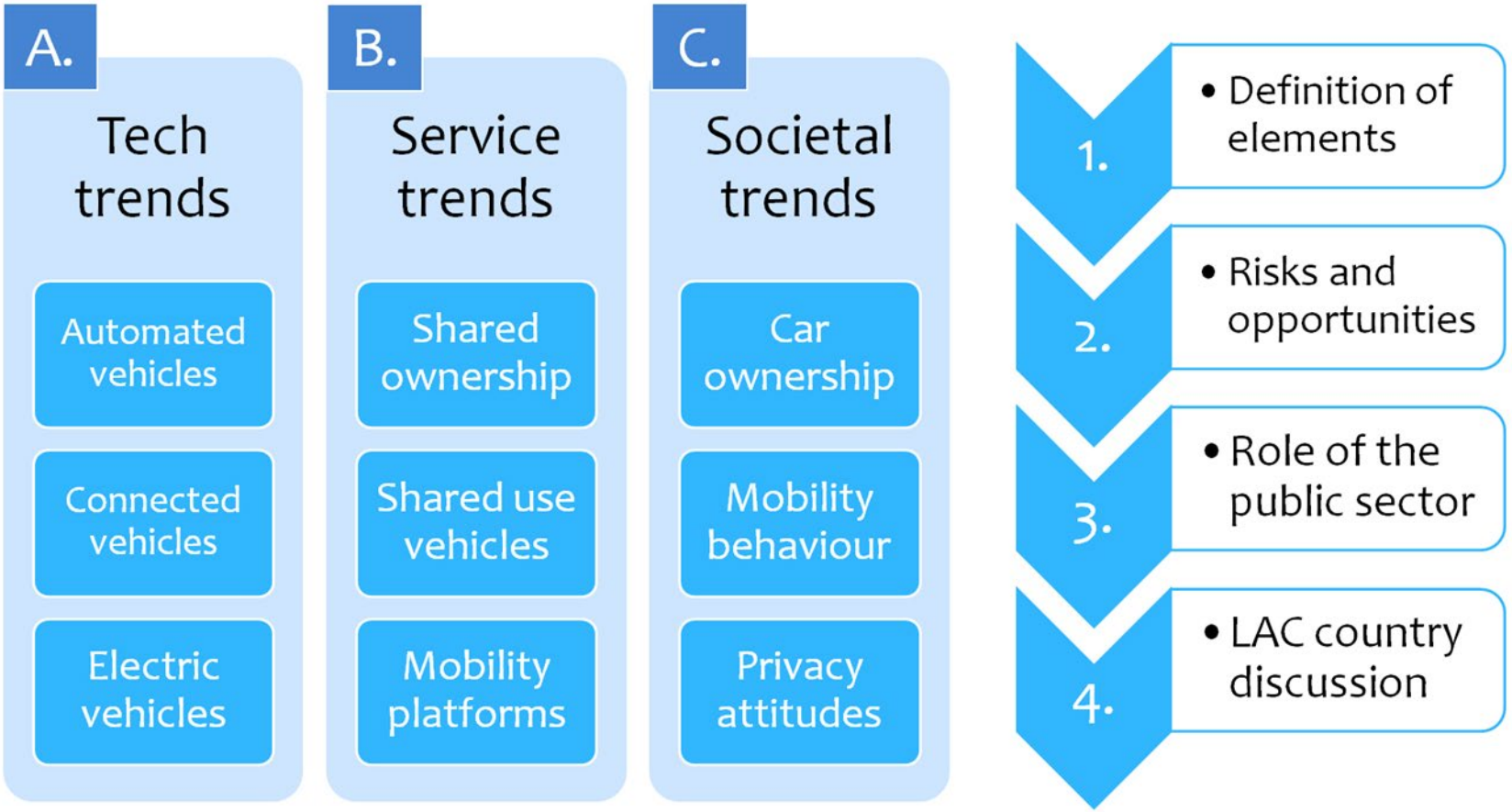


Figure 5. Shares of registered vehicles compared with shares of road traffic deaths in the Region of the Americas, by subregion, 2010



Analysis of trends and responses



A. Technology trends

1. Definition of elements	2. Risks and opportunities
• Clean vehicle technology and fuels • Assistance and full automation • Communication between vehicles • Incident warning functionalities • Scheduling for fleet-based systems • Vehicle charging infrastructure	• Improved road safety performance • But also new accident scenarios • Minor environmental impact (AVs) • Large pollution improvements (EVs) • Minor network/ link capacity gains • Much larger effects of mobility services

3. Role of the public sector	4. LAC country discussion
• Financial incentives for cleaner cars • Industry standards for vehicle safety • Funding for communication systems • Funding for charging infrastructure • Address decreasing fuel tax income • Nudges for enabling mobility services	• Less but rising vehicle ownership rates • Older fleet and less technology maturity • OEM concerns over rising product costs • Higher importance of driver assistance • Road safety levels are a key concern • Realistic view on AVs and EVs necessary

B. Service trends

1. Definition of elements	2. Risks and opportunities
• Emergence of new mobility services • Shared use and ownership of vehicles • App-based ride-hailing providers • Mobility service platforms (MaaS) • New modes (scooters, dockless) • Low-speed first-/ last-mile shuttles	• Improved comfort of public transport • Potential for less private car ownership • But also modal shift from green modes • Induced traffic and more urban sprawl • Zero value of time and empty vehicles • Labour market effects of automation

3. Role of the public sector	4. LAC country discussion
• Incentives for high vehicle occupancy • Infrastructure and land-use planning • Regulation of the ride-hailing industry • Access to data on mobility changes • Pricing based on full externalities • Policies for labour market impacts	• Driver concern over labour markets • Key new market for ride-hailing industry • Regulatory conflicts with new players • Build up conventional public transport • Multi-modal transport authority • Partnership between city and provider

C. Societal trends

1. Definition of elements	2. Risks and opportunities
• Lower car ownership levels in urban areas and for younger generations • Different mobility behaviour with use of platforms, sharing, social media • Ability and use of digital technology but different views on privacy	• Use of micro-mobility in addition to high-quality multi-modal public transport • High vehicle utilisation, less congestion, freed up parking, urban re-development • Focus on built-up urban environment, less solutions in more rural areas

3. Role of the public sector	4. LAC country discussion
• Provide privacy protection policies • Public->private responsibility transfer • But avoiding any vendor lock-in • Develop flexible mobility regulation • Innovation while protecting safety • Capacity building for data science	• Car as an aspirational status symbol • Campaigns to change behaviour • But effect on local OEMs and industry • Quick uptake of mobile internet access • Consider regional economic differences • Existing public transport and expansion

Thank you for your attention!

futurefuel strategies

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GreenMobility

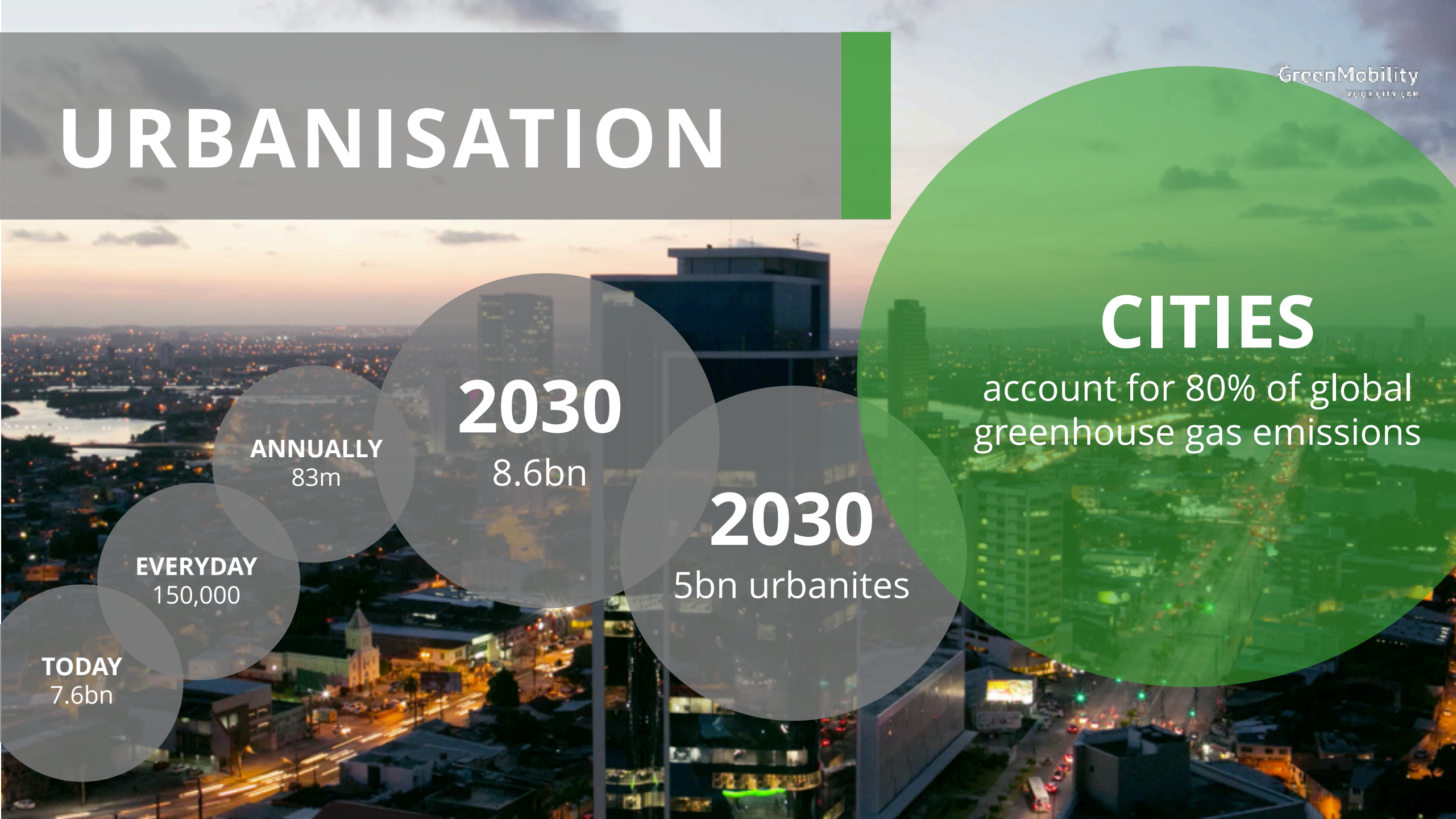
YOUR CITY CAR

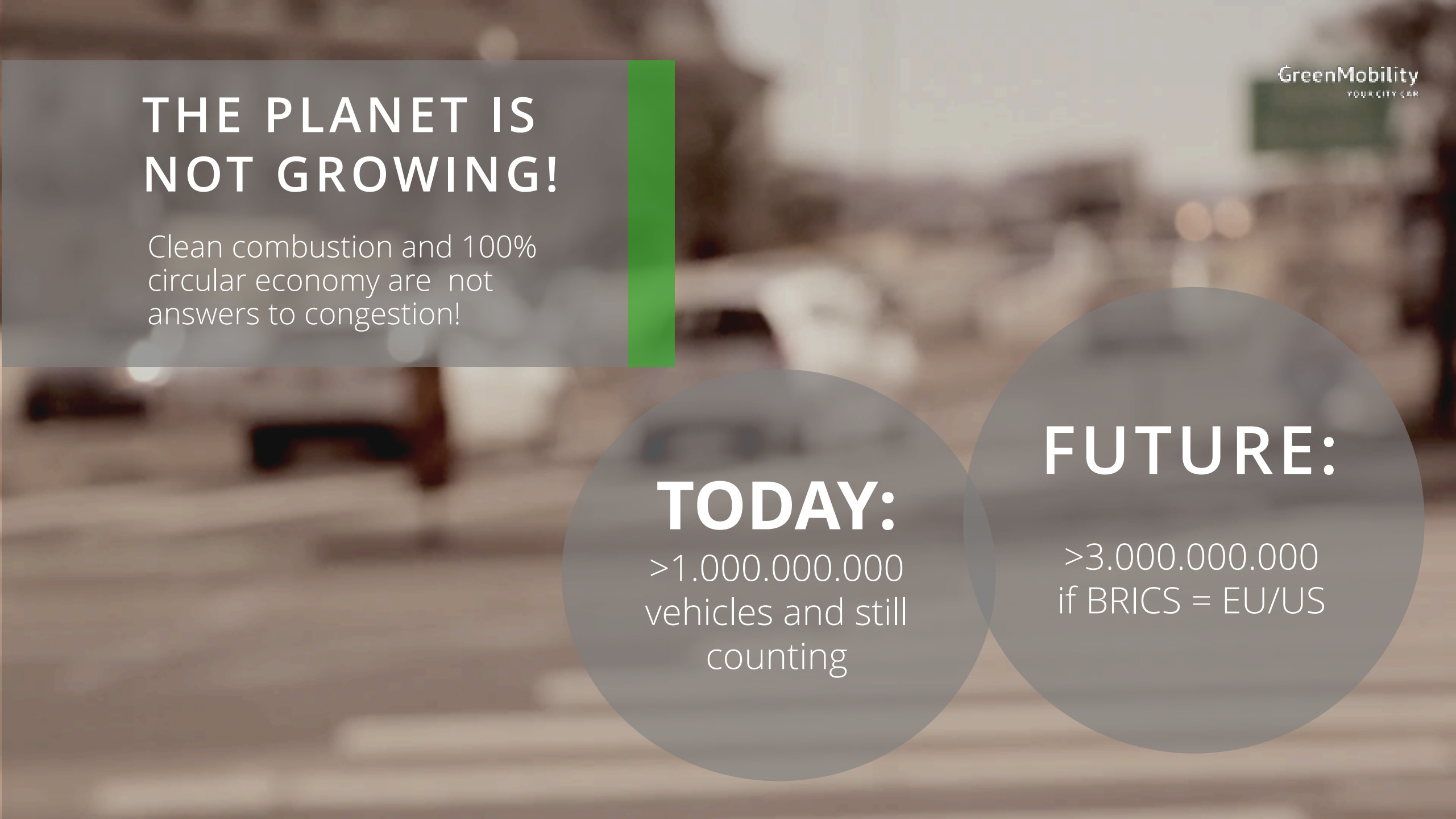
Modern Urban Mobility

An answer to congestion and climate change


3 MEGA TRENDS
URBANISATION
SUSTAINABILITY
SHARING ECONOMY
GreenMobility
YOUR CITY CAR

URBANISATION





THE PLANET IS NOT GROWING!

Clean combustion and 100% circular economy are not answers to congestion!

TODAY:

>1.000.000.000 vehicles and still counting

FUTURE:

>3.000.000.000 if BRICS = EU/US

HOW ARE WE GOING TO SOLVE THESE ISSUES?

THE FUTURE IS NOW!


GreenMobility
Copenhagen & Oslo
52.000 customers
650 EV’s
GreenMobility

THE GREENMOBILITY PRODUCT: **YOUR CITY CAR**

ONE APP IS THE KEY TO ALL CARS

Your smart phone is all you need to use the city cars. The GreenMobility app is the key to find, reserve and unlock the city car

MINUTE DAILY MONTHLY

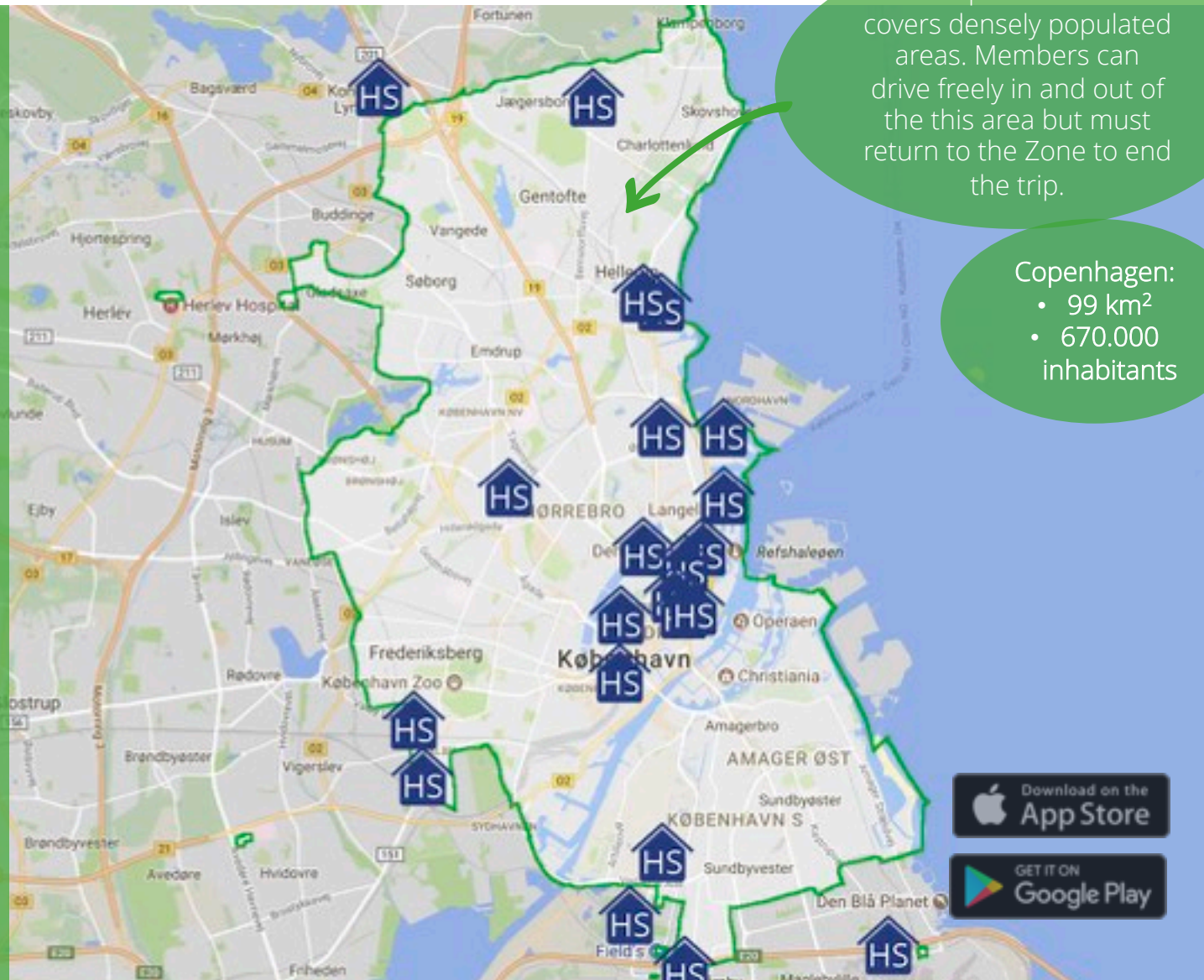
Drive as far and long as you want. You can pay by the minute, per day or drive on a monthly subscription

ALL INCLUSIVE

The price includes parking, power and insurance. Simple, flexible and transparent to use – no extra expenses

DESIGNATED HOTSPOTS

Parking in the city can be a hassle – expensive and difficult to find. GreenMobility offers designated parking in Hotspots, making it easy to park the city car



BARRIERS

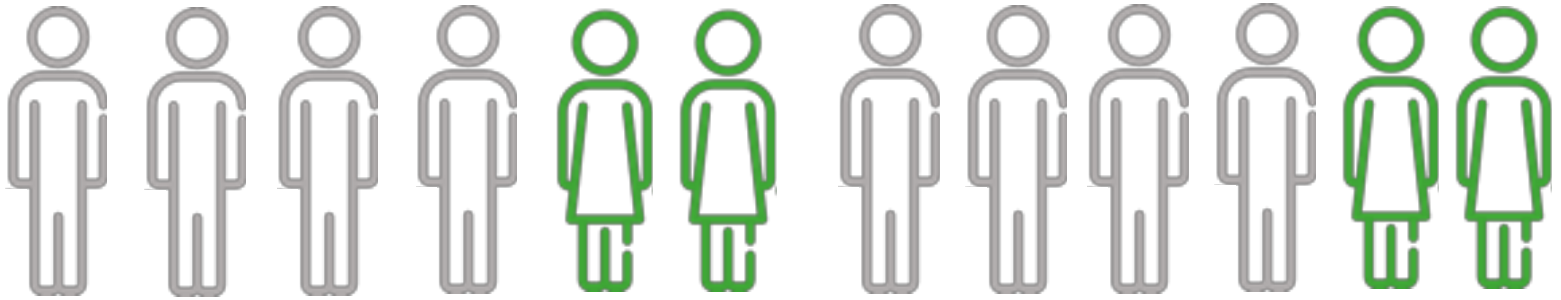
GreenMobility
YOUR CITY CAR

GreenMobility
YOUR CITY CAR

OUR CUSTOMERS

KEY FACTS ON THE B2C USERS

2/3
ARE MALE



>1/2
HAVE THEIR OWN CAR

~50%
HAVE AN ANNUAL HOUSEHOLD INCOME >600,000 DKK

1/5
DRIVE AT LEAST ONCE PER WEEK

~50%
OF USERS ARE YOUNGER THAN 30 YEARS

THE AVERAGE AGE OF OUR USERS IS

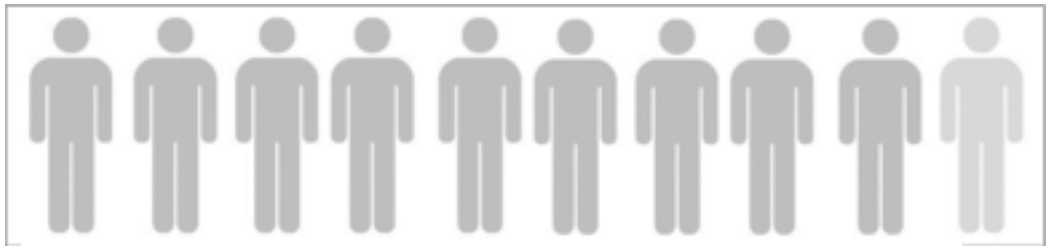
38 YEARS
AVERAGE

Source: Customer satisfaction study (spring 2018)

GREENMOBILITY HAS A HIGH LEVEL OF CUSTOMER SATISFACTION

95%

HAVE TOLD THEIR FRIENDS AND FAMILY ABOUT GREENMOBILITY



89% ARE VERY SATISFIED WITH GREENMOBILITY

15%

USE GREENMOBILITY INSTEAD OF THEIR OWN CAR

16 %

HAVE CONSIDERED **GIVING UP THEIR OWN CAR IN FAVOUR** OF GREENMOBILITY

1/5

HAVE CHOSEN NOT TO BUY OR LEASE A CAR DUE TO GREENMOBILITY

21%

4,5%

HAVE SOLD THEIR OWN CAR OR TERMINATED THEIR CAR LEASE DUE TO GREENMOBILITY

62%

START THEIR GREENMOBILITY TRIP FROM HOME

46% USE GREENMOBILITY IN COMBINATION WITH OTHER FORMS OF TRANSPORTATION

Source: Customer satisfaction survey (spring 2018)

BUSINESS-TO-BUSINESS

- More than 700 BtB & BtG agreements in Copenhagen
- Delivering a sustainable and cheaper mobility solution
- Accelerate usage during off-peak times
- Benefits include:
    - Dual profiles for users
    - Invoicing options
    - Adminstrative tool
- Bonus on the users private account

City of Copenhagen

"Copenhagen Municipality sees great economic, environmental and social potential in the use of sustainable mobility solutions, such as shares cars and City Cars."
Lasse Bonde-Jensen,
CITY OF COPENHAGEN

SAXO BANK

"GreenMobility offer an environmentally friendly and inexpensive transport alternative in the capital region and you don't have to worry about expensive parking as a customer."
Johannes Rovsing,
CEO, SAXO BANK A/S

SELECT COMPANIES:

Vestas. ISS MAERSK novo nordisk

ESTABLISHING THE BUSINESS

PUBLIC TRANSPORTATION

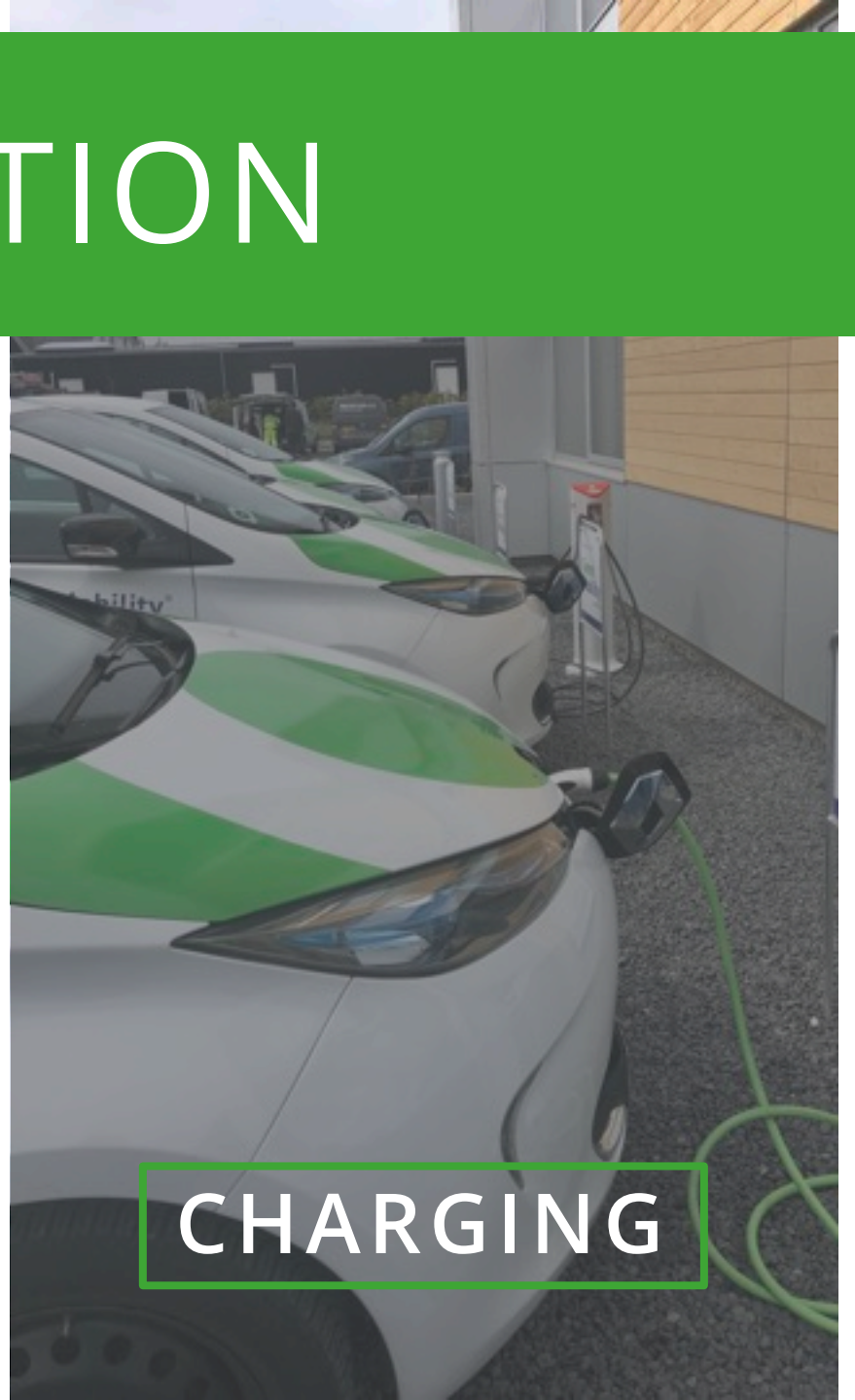
BICYCLES

CAR SHARING SERVICES

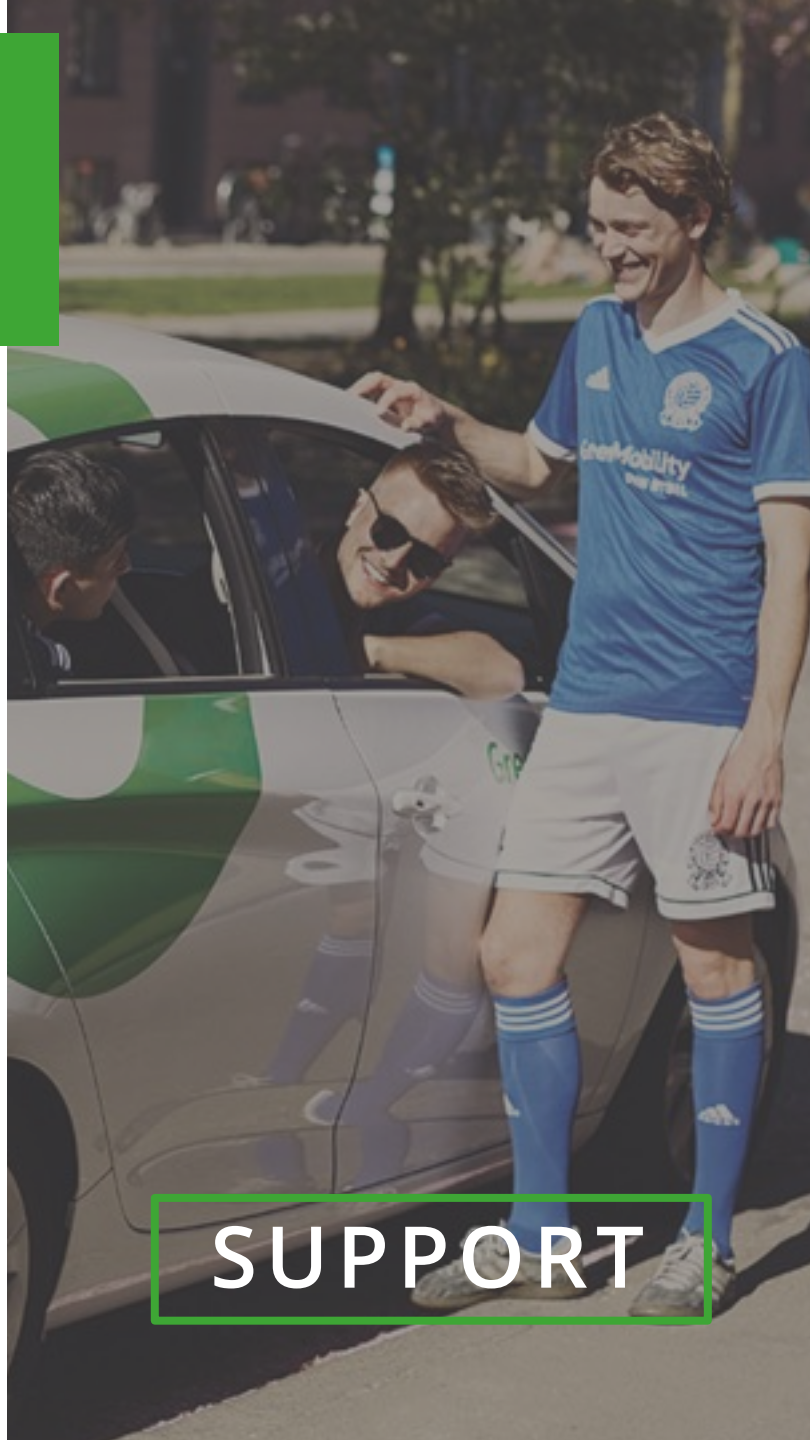
CITY MOBILITY

FOUNDATION

PARKING



CHARGING



SUPPORT

KEEP IT SIMPLE

USER PERSPECTIVE

AVAILABILITY

SIMPLICITY

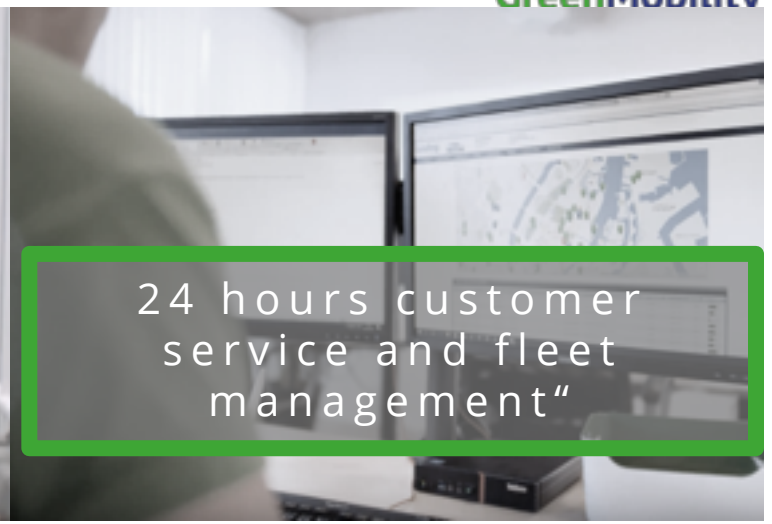
PRICE VS ALTERNATIVE

RANGE

CLEAN

OUR DAY-TO-DAY OPERATIONS

The GreenMobility street team takes care of charging, cleaning and relocation of cars



24 hours customer service and fleet management“

Car data collected in real time

Hands” on the cars every 3.5 day - no dirty cars

PARTNERING

MULTI MODALITY

GreenMobility
YOUR CITY CAR

GreenMobility's new partnership with Rejseplanen will allow consumers to plan their trip across metro, train, bus and now also Your City Car

STRONG PARTNERSHIPS ACROSS THE WORLD

AMBITION:
to establish GreenMobility in +15 cities by 2021

CURRENT :
Copenhagen & Oslo with a total of 650 electric cars

We support our Partners every step of the way... from business plan to launch – and beyond!

Together we share, and thereby reduce the number of private cars in the city, easing parking and congestion.

THIS IS WHAT WE DO

We cater for the climate,
our cities and customers
because sharing cuts costs,
carbon & congestion

partner.greenmobility.com

Anders Wall
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Familiar Realities and New Mobility

Greg Rogers
Director, Government Affairs and Mobility Innovation
Securing America's Future Energy (SAFE)

Securing America's Future Energy

@AVGregR

Today's Discussion

1. Does incumbency take the "new" out of new mobility?

2. What are the behavioral factors that influence transportation modal choices?

3. How will micromobility, autonomy, and the built environment impact new mobility?

@AVGregR

Introduction

Greg Rogers, Director of Government Affairs and Mobility Innovation, SAFE

- Federal advocacy for advanced and emerging technologies in transportation: autonomous, electric, and connected vehicles.
- Co-host of The Mobility Podcast

Securing America's Future Energy (SAFE)

- SAFE is a non-partisan, non-profit advocacy organization dedicated to reducing our national reliance on oil.
- Oil accounts for **92 percent** of the energy powering the U.S. transportation sector.
- SAFE's Energy Security Leadership Council (ESLC) unites prominent business and military leaders to support bipartisan policy solutions to reduce U.S. oil dependence and improve our energy security.

Securing America's Future Energy

@AVGregR

New Mobility, Established Players

Founded 2009

Founded 2012

What happens when a disruptor becomes an incumbent?

- A new philosophy gains traction – presenting opportunities, challenges, and new risk sensitivities.
- Incumbents find new areas to compete and experiment with different business models to gain market share.

New Mobility Goes Multimodal

Uber

- Jump e-bikes
- Scooters
- Autonomous vehicles
- Transit agency partnerships
- Uber Elevate - Vertical Takeoff and Landing (VTOL)

lyft

- Bikeshare (pedal & e-bike)
- Scooters
- Autonomous vehicles
- Transit agency partnerships

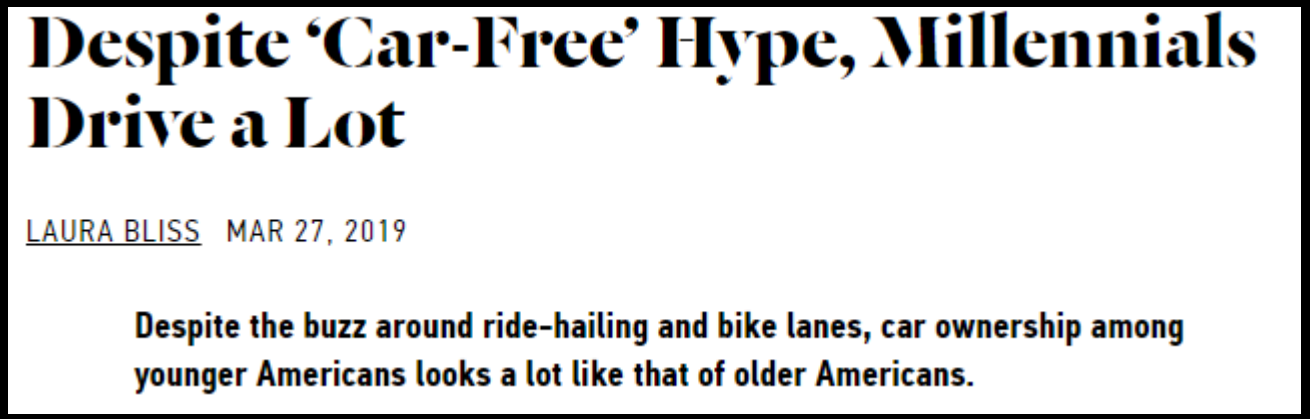
New Mobility, Same Rules

People base their travel decisions on 3 factors:

1. How much will it cost?
2. How long will it take?
3. How convenient and comfortable is it, compared to my other options?

Millennials and Modality

Millennials and Modality



Despite 'Car-Free' Hype, Millennials Drive a Lot

LAURA BLISS MAR 27, 2019

Despite the buzz around ride-hailing and bike lanes, car ownership among younger Americans looks a lot like that of older Americans.

"Controlling for factors like marriage and living in city, [the National Bureau of Economic Research] finds that **Americans born between 1980 and 1984 are just as likely to own cars compared to, say, their parents' cohort.** What's more, when driving habits are measured in terms of vehicle-miles traveled, some Millennials really are the worst."

@AVGregR

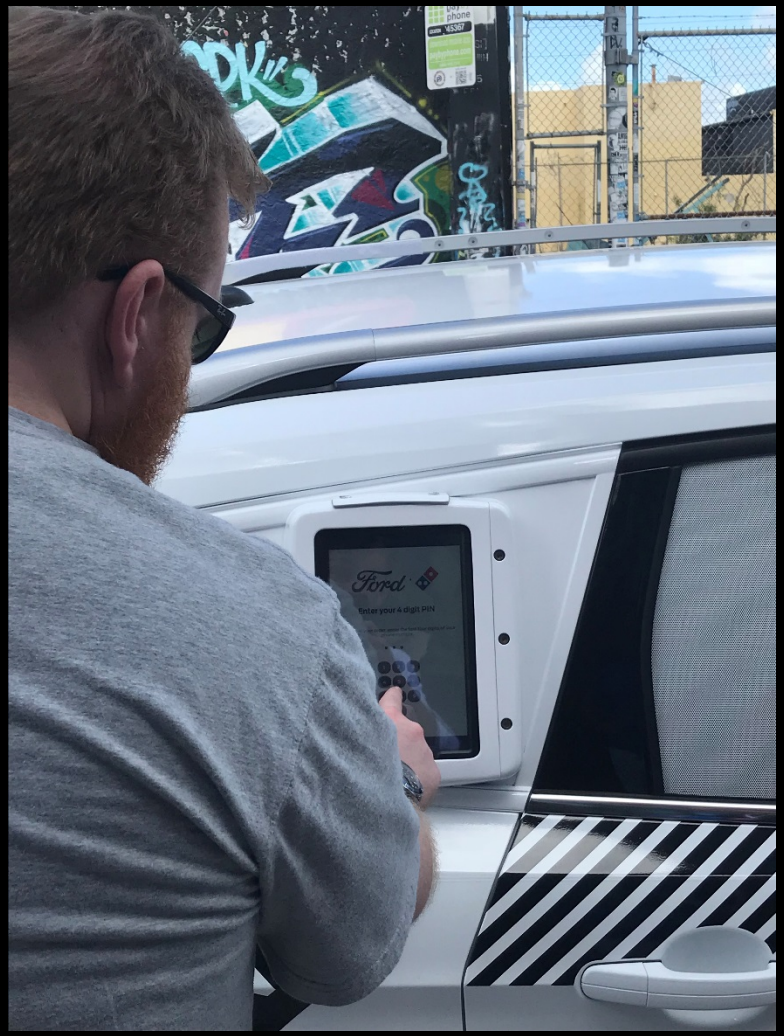
Micromobility

Autonomous Vehicles

Ford/Argo in Miami - Operations

- Distributed network for parking, maintenance and repair, daily operations, etc.
- AVs will not entirely eliminate the need for parking – especially if a platform chooses to operate a fleet of EVs

Ford/Argo in Miami - Dominos Pizza



Ford/Argo in Miami - Postmates

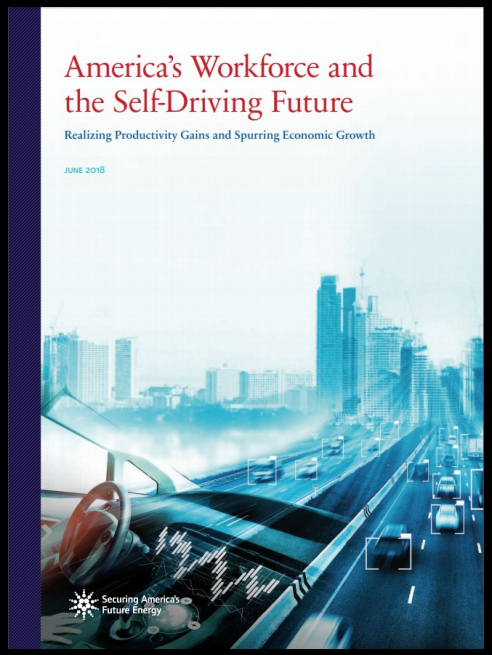
Ford/Argo in Miami - Small Businesses

Local business partnerships:

- Dry cleaner
- Flower shop
- Pet store
- Local restaurants

America's Workforce and the Self-Driving Future

SAFE worked with 3 teams of economists to bridge the research gap for how AVs will impact the workforce.



Key findings:

- AVs have many of the same characteristics as other "catalyzing technologies" like ATMs, the Internet, and the Interstate Highway System.
- AVs will yield **$800 billion annually** in economic and societal benefits by 2050.
- AVs will marginally contribute to an increase in the unemployment rate – only about **0.06% to 0.13%.**
- AVs will create new jobs, new business models, and entirely new markets.

For more information and to download the full report:
AVworkforce.secureenergy.org

Securing America's Future Energy

@AVGregR

Mobility is Opportunity

Case Study: Gary, Indiana

Increased willingness to travel using an AV will impact:

- **Workforce:** More jobs in reach for communities underserved by transit and weary car commuters.
- **Commerce:** Potentially increasing a mall's customer base by up to 50%.
- **Quality of Life:** More time for family and social interactions.

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Consumer and Social Benefits of AVs

Quantified Benefits of Autonomous Vehicles

Public Benefits by 2050 (annual)	**$633 Billion**
Congestion Mitigation	$71 Billion
Accident Reduction – Economic Impact	$118 Billion
Accident Reduction – Quality of Life Improvements	$385 Billion
Reduced Oil Consumption	$58 Billion
Consumer Benefits by 2050 (annual)	**$163 Billion**
Value of Time	$153 Billion
Reduction in Cost of Current Taxi Service	$10 Billion
Total Annual Benefits (by 2050)	**$796 Billion**

Source: David Montgomery, *Public and Private Benefits of Autonomous Vehicles*, June 2018.

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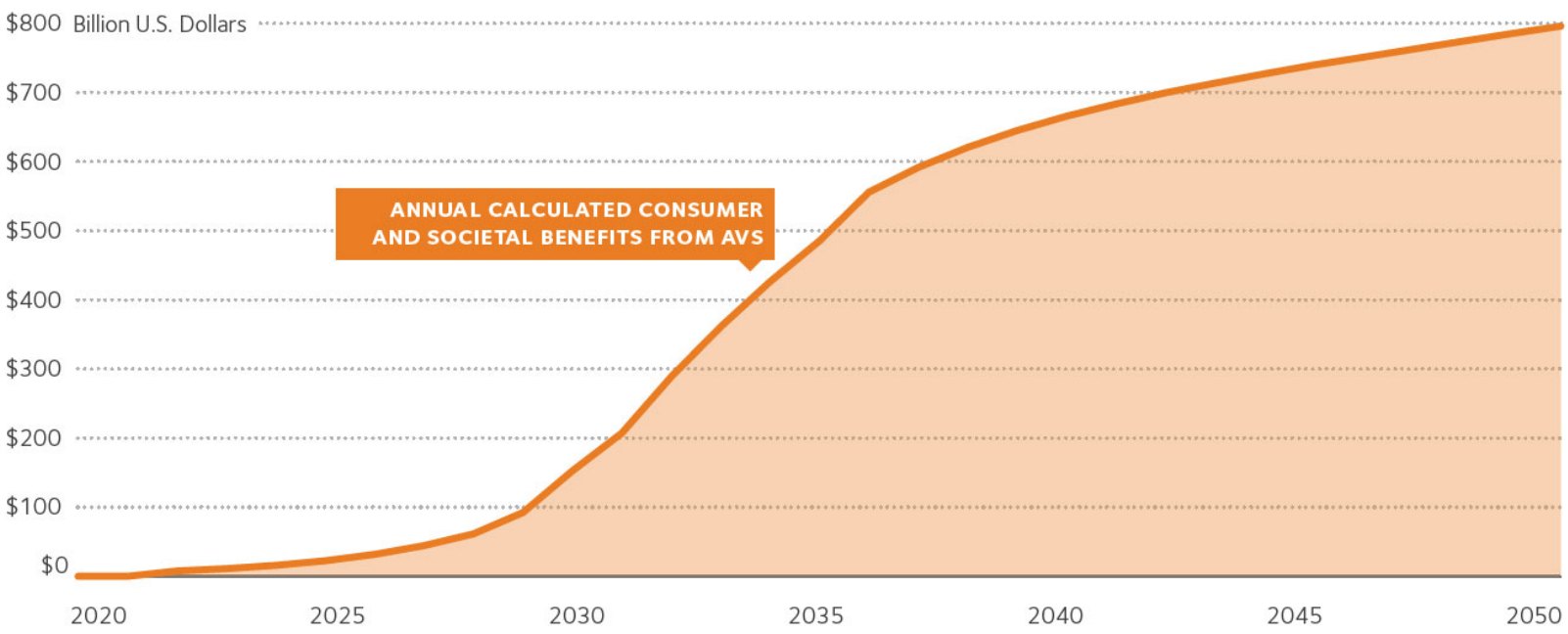
Consumer and Social Benefits of AVs



Source: David Montgomery, *Public and Private Benefits of Autonomous Vehicles*, June 2018.

The Built Environment

The growth of transportation network companies (TNCs), micromobility, and e-commerce is prompting cities to rethink street design, congestion mitigation, and curb use.

- **Shared Use Mobility Zones (SUM Zones):** The structure of vehicle trips is fundamentally changing in major urban areas.
- **Micromobility:** Dockless scooters and shared e-bikes are expanding the constituency for active transportation infrastructure – adding more localized supporters for bike lanes.
- **Congestion pricing:** The results of New York City's congestion pricing program will determine whether this becomes a broader national trend.

Ford/Argo in Miami - PU/DO Zones

Thank You

Please keep in touch:

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