World Economic Forum's
Platform for Shaping the Future of Mobility:
Sustainability is Boosting Private-Public Partnerships

October 8, 2019
MaaS Alliance
Helsinki

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We convene key stakeholders and act as integrator and aggregator to amplify and scale the world's best approaches and strategies for impact

The World Economic Forum is the international organization for public-private cooperation. **Our mission is to improve the state of the world.**

Focused on **advancing change** for business and society, we provide a **global, independent, impartial** and **future-oriented** platform for the world's leaders to come together to **shape the future**.

The Forum focuses on **multi-stakeholder cooperation,** bringing together leaders from business, government, civil society, academia and youth to **achieve impact together** that they could not achieve alone.
Stakeholders can also use the Forum as a platform to scale their own projects.

Government

Civil Society

Business

Academia

Innovators

Media

Cultural and Sports Leaders

Youth

Young Global Leaders

Social Entrepreneurs

Technology Pioneers

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Thematic Engagement With The Forum

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Companies can tailor their Forum engagement based on their strategic priorities, across Platforms, Regions, Communities, and Knowledge

Our Platforms
Shaping the Future of...

Advanced Manufacturing and Production	Energy	Mobility
Consumption	Financial and Monetary Systems	Digital Economy and New Value Creation
Cities, Infrastructure Development and Urban Services	Health and Healthcare	Global Public Goods
Long-Term Investing	Culture, Media and Entertainment	Inclusive Economies and Societies
International Trade and Investment	Technology Governance (Artificial Intelligence)	Technology Governance (Block-chain and Distributed Ledger Technology)
Technology Governance (Data)	Technology Governance (IOT, Robotics and Smart Cities)	Cybersecurity and Digital Trust

Regions
Shaping the regional agenda and addressing critical challenges

Africa	ASEAN
China	Europe and Eurasia
Latin America	Middle East and North Africa
North America	South Asia

Communities
Interconnected communities of peers

- Family Business Community
- Global Shapers
- Young
- Schwab Foundation for Global Entrepreneurship
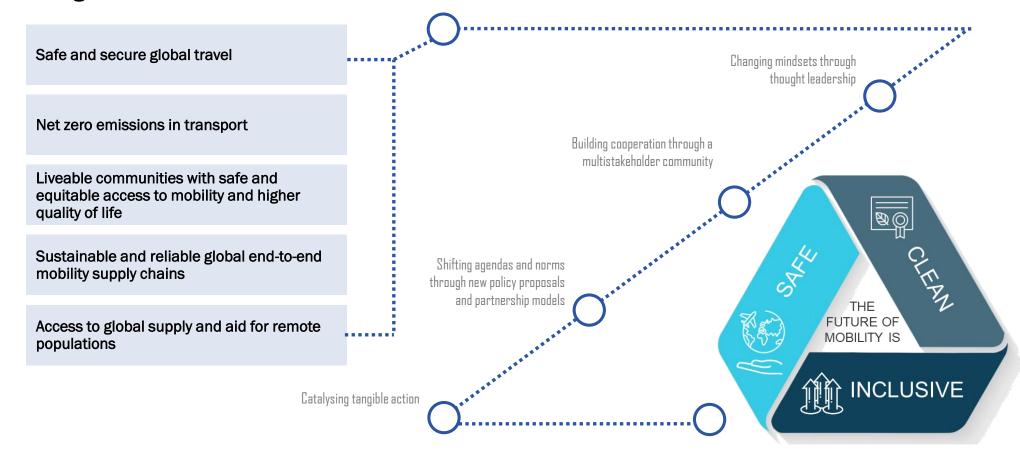- Technology Pioneers

Knowledge

- Strategic Intelligence

Platform for Shaping the Future of Mobility

Advancing safe, clean and inclusive movement of people and goods

Today's mobility system cannot accommodate tomorrow's mobility demand. A safe, clean and inclusive mobility future is possible by applying systems thinking to generate impact against key challenges.

Safe and secure global travel

Net zero emissions in transport

Liveable communities with safe and equitable access to mobility and higher quality of life

Sustainable and reliable global end-to-end mobility supply chains

Access to global supply and aid for remote populations

Changing mindsets through thought leadership

Building cooperation through a multistakeholder community

Shifting agendas and norms through new policy proposals and partnership models

Catalysing tangible action

SAFE CLEAN

THE FUTURE OF MOBILITY IS

INCLUSIVE

Platform For Shaping The Future of Mobility:
Four Focus Areas

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Automotive and Autonomous Mobility

Aerospace and Drones

Aviation, Travel and Tourism

Supply Chain and Transport

Automotive Industry Dynamics Are Shifting
A New Mobility Paradigm Emerged

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*Partner
Engage To
Navigate
These Shifts*

Product Focus: the car

Customer **owns** the vehicle

Personal: Customer uses vehicle alone or with family and friends

Driven: Customer drives the vehicle

Market Economy: Innovation in house with trusted supply base

Mechanical engineers rule

Linear production

Volume: Sell more cars and achieve economies of scale

Service Focus: the mobility experience

Customer **uses** the vehicle

Shared: Customer shares vehicle with social network or strangers

Autonomous: Algorithms drive the vehicle

Platform Economy: Innovation ecosystem with dynamic partnerships

Software engineers rule

Circular economy

Value: Deliver targeted profitable mobility solutions for people

How can global automotive and technology leaders help reinvent mobility?

Shape the emerging business and regulatory environment concerning:

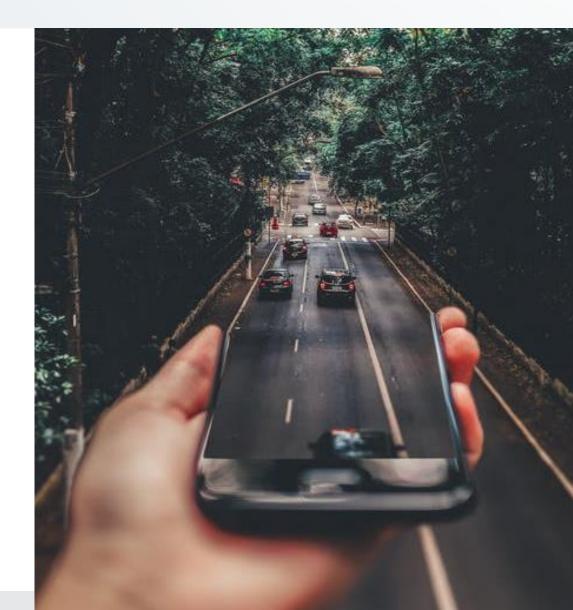Electrification and alternative powertrains

Automated technologies

Connectivity

Shift to MaaS

Demonstrate their commitment to clean, safe, and inclusive mobility while:

Mastering industry disruptions driven by the Fourth Industrial Revolution

02

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How can we help cities and nations meet their mobility goals in the face of rapid technological advancement?

- *Reduce safety risks*
- *Reduce congestion*
- *Expand equitable and accessible mobility options*
- *Reduce greenhouse gas emissions*
- *Encourage high occupancy modes and trips*
- *Share data to evaluate service benefits and impacts*

Goal
Co-design policy frameworks for sustainable AV rollout.

Impact
The co-design of policy frameworks ahead of AV commercialisation will:

1. Forge coherent digital, infrastructure, and regulatory mobility systems readiness for maximising the societal, environmental and economic benefits of AVs
2. Guide the development of AV products and business models that are aligned with a sustainable mobility system vision

Core Participants
Led by the World Economic Forum in partnership with the city of San Francisco and the State of Israel's C4IR Affiliate.

Next Steps

- Multi-stakeholder workshops for SF and Israel (October)

- Refine framework, socialize findings with SF city government (November)

- Release San Francisco findings (December); formal kickoff for Israel (April, 2020)

SIMSystem: Designing Seamless Integrated Mobility

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How can we help cities meet their mobility goals in the face of rapid changes?

Goal

Leverage digital tools to design and execute catalytic multi-modal solutions to address the systemic gaps that result from population growth, lagging infrastructure investment and technological disruption.

Impact

1. Improve regional mobility options
2. Increase regional mobility efficiency and access by defining the foundational digital integration layer for data sharing, governance, privacy, security, and standardization
3. Expand the regional connectivity network to facilitate the operations of autonomous technologies across the border

Core Participants

Led by the World Economic Forum in partnership with Deloitte and the cities of Ann Arbor, Detroit, and Winsor, partners include Via, Siemens, Hyperloop, University of Michigan, Bestmile, just to name a few.

Next Steps

- Multi-stakeholder workshops in pilot cities (on-going)

- Multi-stakeholder workshops with benchmark cities (on-going)

- Release of technical roadmap, framework for data sharing, list of technical requirements, analysis of employer-sponsored mobility pilot and mobility for underserved users pilot (January, 2020)

Rural Mobility

How can we apply technology advances to right-size mobility options?

Goal

Develop, test, and scale an operational framework for the widespread expansion of autonomous and urban mobility innovations to alleviate transportation deserts in rural and small cities in Japan.

Impact

1. Create resilient and cooperative systems for AV/MaaS operators and city governments

2. Develop sustainable public-private funding partnerships

3. Provide mobility to vulnerable populations

Core Participants

Led by The World Economic Forum, Centre for the Fourth Industrial Revolution in Japan, and McKinsey & Company, participants include MLIT, METI, Hiroshima Prefecture, Mei Prefecture, Akitakada City, MaaS Tech Japan, Sompo Digital Lab, Denno Kotsu, Toyota Motors, DeNA, University of Tokyo, DBJ, Atsumi & Sakai, Institute of Behavioral Studies

Next Steps

- Launch transportation sustainability index, ready-to-use toolkit and framework for rural mobility reform (December)

- Align suitable long-term solutions and pilot framework (beginning February, 2020)

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Circular Cars

How can we apply circular economy principles to improve the automotive industry?

Project Overview

The automotive industry is undergoing a massive change toward mobility as a service, which necessarily means far greater asset utilization. Simultaneously, OEMs are seeing the value of designing for circularity and recyclability. These trends in combination can drive significant cost savings while contributing to clean air and climate action targets.

Project Objectives

1. Generate new insights, evaluate the economics of alternative options, and define a relevant research agenda
2. Trigger concrete industry action and develop policy proposals to make projects in the areas of materials, manufacturing, after-use, material platforms, and relevant metrics.

Core Project Participants

At the core of the project are the World Economic Forum, the WBCSD, Systemiq, and LeasePlan. The project is in cooperation with related initiatives of the Advanced Manufacturing, Advanced Materials, and the PACE initiative.

Next Steps

The project will convene a kick-off meeting in spring 2019, with interim work product and touchpoints leading to the Sustainable Development Impact Summit (September 23-24, 2019).

Global Battery Alliance

How can the industry lead on sustainable battery transition?

Project Overview

Batteries are a core technology enabling the transformative shift to decarbonize energy and transport systems. However, without deliberate intervention, the potential of batteries to support sustainable development and climate change mitigation is undermined by its own value chain.

Project Objectives

The Global Battery Alliance seeks to address these challenges. As a global collaboration platform and public-private partnership hosted by the Forum, it seeks to catalyze, connect and scale-up efforts to ensure that the battery value chain is socially responsible, environmentally and economically sustainable and innovative.

Objectives include building stable and transparent supply chains; develop the circular and low-carbon value chain required to unlock the capacity of batteries to help realize the 2015 Paris climate accord; and to support the innovative use of batteries to bring electricity and productivity.

Next Steps

The Alliance seeks to move from building and catalyzing partnerships to implementation and delivery. It seeks to take action and deliver measurable results across the Alliance's areas of work in raw materials, circular economy, and innovation

Global New Mobility Coalition

How can we harness technological advances to achieve:

- *Efficiency increase > 70%*
- *CO2 emissions decrease > 95%*
- *Cost savings > 40%*

Goal

Co-develop, pilot, and scale awareness-building and policy initiatives that promote the benefits of shared, electric, and automated mobility technologies (SEAM) to society and the environment.

Impact

1. Redress detrimental impact on climate and air quality from vehicles
2. Reinforce and communicate a comprehensive and positive vision for low carbon, more sustainable transportation in cities
3. Promote public-private partnerships to accelerate SEAM adoption

Core Participants

With over 100 members, steering members include the World Economic Forum, ClimateWorks, UC Davis, EV100, Uber, Energy Foundation China, Technion, Lyft, Via, BMW, Ford, and Uber. C40 and OECD-ITF are key knowledge partners. Was launched at SDI UN-Forum Summit.

Next Steps

Oct. 2019: Release a first op-ed during C40 Mayor Summit

Oct. 2019: Announce first pilot cities at the Global Future Mobility Summit

Dec-Jan. 2019: Meeting and further city announcements at Conference of the Parties (Dec) and the Transportation Research Board (Jan)
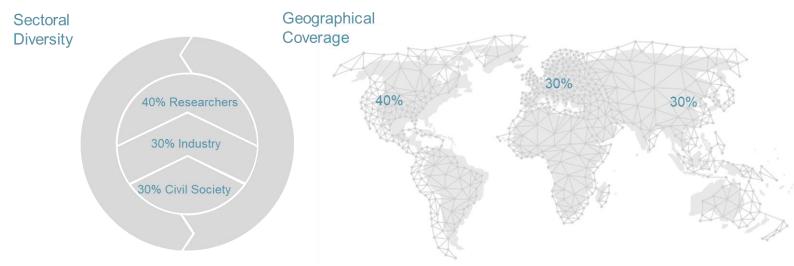
Global New Mobility Coalition Introduction

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GLOBAL NEW MOBILITY COALITION

The Global New Mobility Coalition (GNMC), conceptualized during the Climate Action Summit in San Francisco a year ago, is officially launched today as part of the Forum's Sustainable Impact Summit highlights.
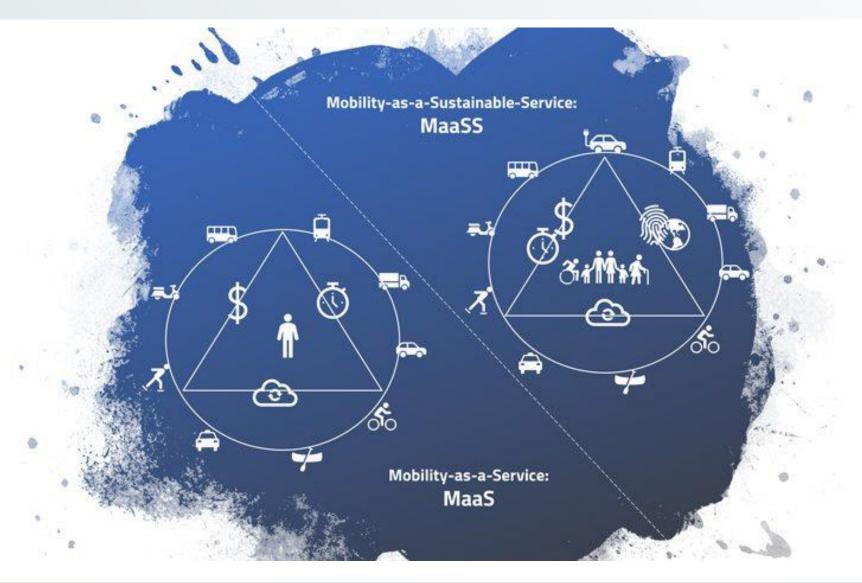
POLIS CITIES AND REGIONS NETWORKING FOR INNOVATIVE TRANSPORT SOLUTIONS
POLIS Global Platform

NREL

cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

C40 CITIES

THE WORLD BANK

UNDER2°

International Transport Forum

UITP ADVANCING PUBLIC TRANSPORT

BERKELEY LAB

Uber

Ford
FORD SMART MOBILITY

BMW

VIA

DiDi

Maas GLOBAL

PROTERRA

NAVINFO 四维图新

lyft

HONDA

WELTMEISTER 威马汽车

广汽集团 GAC GROUP

ENERGY FOUNDATION 能源基金会

ROCKY MOUNTAIN INSTITUTE

NRDC

MIT

UNIVERSITY of WASHINGTON

China EV100 中国电动汽车百人会

הטכניון מכון טכנולוגי לישראל TECHNION Israel Institute of Technology

Berkeley UNIVERSITY OF CALIFORNIA

NYU

WE MEAN BUSINESS

ClimateWorks FOUNDATION

UCDAVIS

Securing America's Future Energy

University of Oregon URBANISM NEXT

THE CLIMATE GROUP

LSE THE LONDON SCHOOL of ECONOMICS AND POLITICAL SCIENCE

ACES NORTHWEST NETWORK

NUMO

University of Cologne

Sectoral Diversity

40% Researchers

30% Industry

30% Civil Society
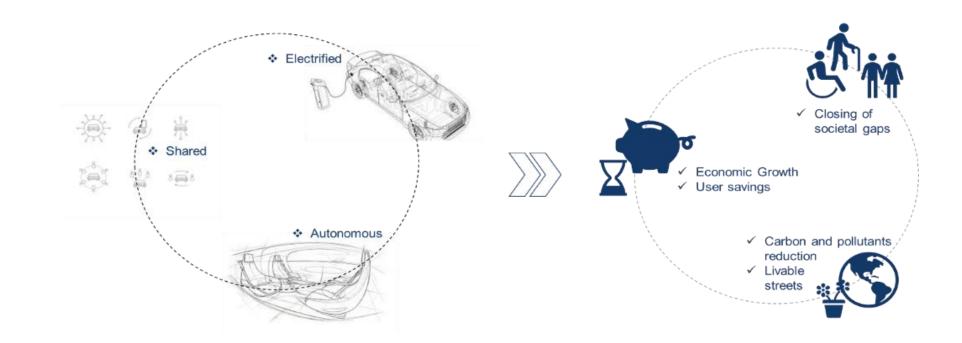
Geographical Coverage

40%

30%

30%

- *Indicators of success:*

- Time
- (True) Cost
- Safety
- Equity
- ...?

03

The Opportunity presented by Shared,
Electric and Automated Mobility (SEAM)

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- *Seamlessly integrate mobility and urban development*

- *Prioritize active, shared micro-modes and shared-rides*

- *Prioritize zero-emissions mobility*

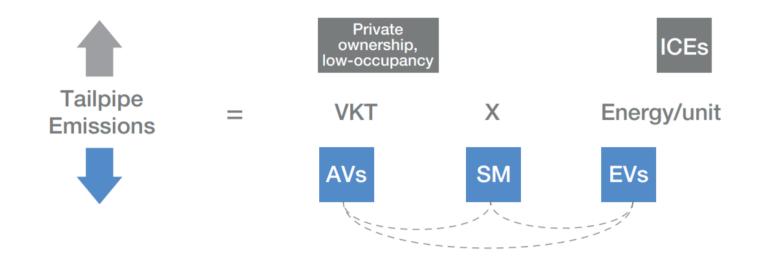- *Pursue automated mobility as part of electric and high occupancy*

- Electrified
- Shared
- Autonomous

✓ Closing of societal gaps

✓ Economic Growth
✓ User savings

✓ Carbon and pollutants reduction
✓ Livable streets

SEAM for Faster and Higher Levels of Emissions Reduction

With SEAM:

- *Efficiency increase > 70%*

- *CO2 emissions decrease > 95%*

- *Cost savings > 40%*

SEAM air quality and climate benefits – 45-95% reduction in emissions if combined right
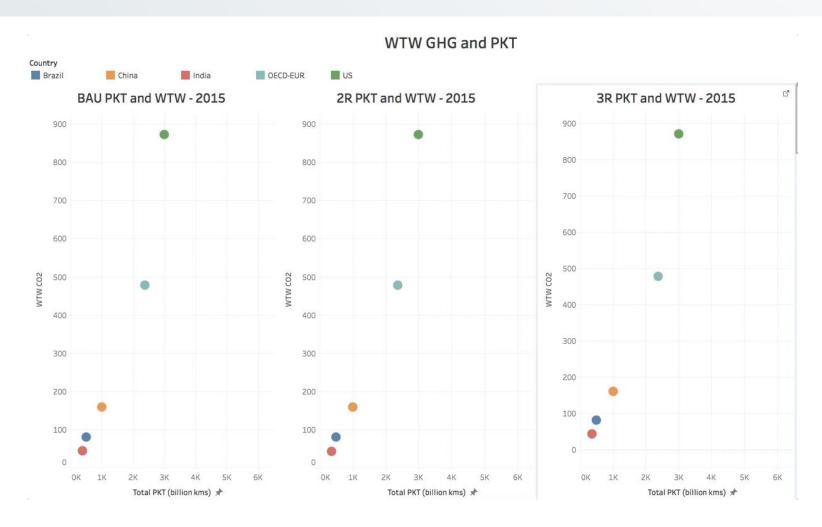
$$\text{Tailpipe Emissions} = \text{VKT} \times \text{Energy/unit}$$

Private ownership, low-occupancy → AVs

SM

ICEs → EVs

Note: VKT = vehicle kilometres travelled; ICE = internal combustion engine; AV = automated vehicle; SM = shared mobility; EV = electric vehicle

03

Avoiding the Adverse Effect of New Mobility on VKT and PKT

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- *Currently, emissions from mobility will double by 2050.*

- *Passenger vehicles account for 70% of these mobility GHG emissions and cause over 50% of city air pollution.*

- *SEAM can reduce number of vehicles from 2.1 billion to 0.5 billion in 2050.*

WTW GHG and PKT

https://steps.ucdavis.edu/gifsanimations-for-the-three-revolutions-in-urban-transportation/

03

GNMC Principles, Vision, Dimensions of Action, Informed Decision-making

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A 4-Step approach:

◀ Governance Work Principles

◗ Governance Vision and Goals

◗ Governance Instrumentation
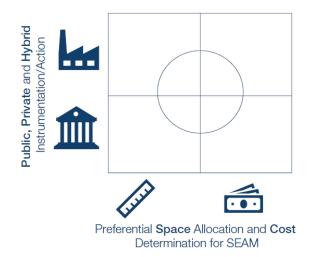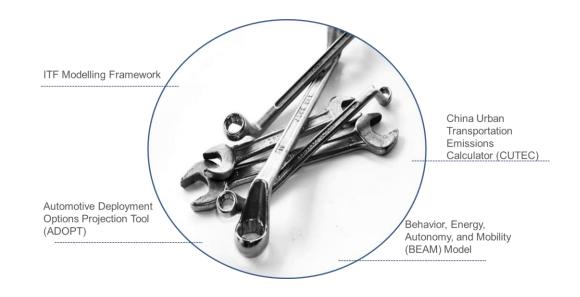
◗ Real-world Evaluation

A 2-Dimension effort:

Public, **Private** and **Hybrid** Instrumentation/Action

Preferential **Space** Allocation and **Cost** Determination for SEAM

ITF Modelling Framework

China Urban Transportation Emissions Calculator (CUTEC)

Automotive Deployment Options Projection Tool (ADOPT)

Behavior, Energy, Autonomy, and Mobility (BEAM) Model

03

**Highlights:
Our SEAM Governance Framework**

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IMPROVING THE STATE
OF THE WORLD

White Paper

Shared, Electric and Automated Mobility (SEAM) Governance Framework
Prototype for North America and Europe

May 2019

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白皮书

共享、电动和无人驾驶出行（SEAM）治理框架
模板与建议

2019年5月

Lead authors, World Economic Forum LLC

Maya Ben Dror, Lead, Autonomous and Urban Mobility

Michelle Avary, Head, Autonomous and Urban Mobility

Contributing authors

Austin Brown, Professor, University of California, Davis, USA

Sandra Caballero, Project Specialist, Autonomous and Urban Mobility, World Economic Forum

Joseph Chow, Assistant Professor and Deputy Director, C2SMART University Transport Center, New York University, USA

Carl Friedrich Eckhardt, Head, Center of Competence, Urban Mobility, BMW (Bayerische Motoren Werke), Germany

Anthony Eggert, Director, Transportation, ClimateWorks Foundation, USA

Luis Martinez, Transport Analyst, International Transport Forum, Organisation for Economic Co-operation and Development (OECD), Paris

Galina Russell, Head of Operations, Envoy Technologies, USA

Ryan Westrom, Mobility Partnership Lead, Ford Motor Company, Greenfield Labs, USA

Christoph Wolff, Head, Future of Mobility, World Economic Forum

Arturo Ardila-Gomez, Global Lead Urban Mobility & Lead Transport Economist, World Bank

Chen Jianhua, Transportation Program Officer, Energy Foundation, China

Guo Jifu, Director, Beijing Transportation Institute, China

Li Shanshan, Vice Country Director, Institute of Transportation and Development (ITDP), China

Liu Bin, Chief Researcher, Policy Research Center, CATARC, China

Liu Cheng, Associate Research Fellow, China Academy of Transportation Science (CATS) China

Liu Xieye, Program Manager, C40

Qin Lanzhi, Senior Researcher, Innovation Center for Energy and Transportation (iCET)

Wu Sally Xiaoyuan, Associate Professor, Shianghai JiaotongTongji University, China

Wu Zongxiang, Distinguished Research Fellow, China Guangdong Provincial Traffic Information Engineering Technology Research Center and Shenzhen Urban Transport Center (SUTPEC)

Xiong Ying, Senior Researcher, Top Level Design and Strategic Synergy for Automotive Revolution, China EV100

Yew Mona, Deputy Director, China Program NRDC, China

Zhou Weimin, Senior Transport Specialist, World Bank China

Highlights:
Ride-hailing fleet electrification in London

Reliance on public fast charging increases costs by about 30%...so, it takes two for Tango:

- *London introduced aggressive goals (50% by 2021, 100% by 2025) and subsequent regulations*

- *Uber introduced a 0.5GBP per-km charge to subsidize the conversion to electric cars.*

Highlights:
Loading hubs in Seattle center piloted

Designing loading hubs is a hard task, and the impact isn't yet clear:

- Seattle tested two hubs with support from Amazon and two ride-hailing companies

- Washingtonian analysis yielded useful results for next steps

Highlights:
Shared autonomous rides in Shanghai

Testing shared AV rides in China:

- *Shanghai district permitted the testing of shared AV rides*

- *Didi committed to analyze and share pilot results*

Advancing safe, clean and inclusive movement of people and goods

How do I engage with projects through the Platform for Shaping the Future of Mobility?

Forum-Led Projects

Projects created and led by the World Economic Forum.

Known Traveller Digital Identity (KTDI)
Piloting the KTDI concept with the goal of having Dutch and Canadian nationals enrol in the KTDI platform and complete an end-to-end journey in a contained live environment using their biometrics instead of passports by early 2020. Components of the journey will be tested and integrated in late 2019.

Joint Venture Projects

Projects the Forum leads as a joint venture with other stakeholders.

Space Sustainability
The Space Sustainability Rating project was launched in cooperation with European Space Agency, Space Enabled Research Group at MIT's Media Lab, University of Texas and Bryce Space and Technology. The project promotes existing guidelines for orbital debris mitigation by increasing transparency and creating market pressure to drive the sector's sustainable growth.

Partner-Led Projects

Projects led by Partners of the Forum. We support, highlight and amplify these projects.

Hydrogen Council
Launched at the World Economic Forum's 2017 Annual Meeting, the Hydrogen Council is a global initiative of leading energy, transport and industry companies with a united vision and long-term ambition for hydrogen to foster the energy transition.

THANK YOU!

Maya Ben Dror

Automotive and Autonomous Mobility
Lead

Maya.BenDror@Weforum.org

Highlights:
UC Berkeley for common language

SAE International with the support of UC Berkeley developed definitions for shared mobility terms –"*Taxonomy and Definitions for Terms Related to Shared Mobility and Enabling Technologies – J3163™*"

KEY DEFINITIONS

SHARED MOBILITY is the shared use of a vehicle, motorcycle, scooter, bicycle, or other travel mode; it provides users with short-term access to a travel mode on an as-needed basis

BIKESHARING provides users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Bikesharing fleets are commonly deployed in a network within a metropolitan region, city, neighborhood, employment center, and/or university campus.

CARSHARING offers members access to vehicles by joining an organization that provides and maintains a fleet of cars and/or light trucks. These vehicles may be located within neighborhoods, public transit stations, employment centers, universities, etc. The carsharing organization typically provides insurance, gasoline, parking, and maintenance. Members who join a carsharing organization typically pay a fee each time they use a vehicle.

MICROTRANSIT is a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing.

RIDESHARING (also known as carpooling and vanpooling) is defined as the formal or informal sharing of rides between drivers and passengers with similar origin-destination pairings. Ridesharing includes vanpooling, which consists of 7 to 15 passengers who share the cost of a van and operating expenses, and may share driving responsibility.

RIDESOURCING services are prearranged and on-demand transportation services for compensation in which drivers and passengers connect via digital applications. Digital applications are typically used for booking, electronic payment, and ratings.

SCOOTER SHARING allows individuals access to scooters by joining an organization that maintains a fleet of scooters at various locations. Scooter sharing models can include a variety of motorized and non-motorized scooter types. The scooter service provider typically provides gasoline or charge (in the case of motorized scooters), maintenance, and may include parking as part of the service. Users typically pay a fee each time they use a scooter. Trips can be roundtrip or one way.

For more information, visit sae.org/shared-mobility

Highlights:
Our SEAM Governance Framework

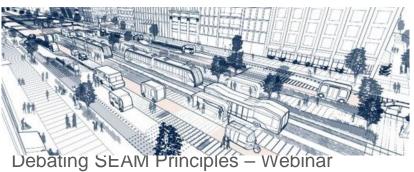Data is the fuel of mobility. Don't spill it for nothing - Blog

SEAM Building Codes - Blog

Pricing – Op-ed

Debating SEAM Principles – Webinar

0:06 / 0:52

Global New Mobility Coalition Output

03

Highlights:
Uber's fleet electrification in London

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See https://www.theicct.org/publications/policy-briefing-electrify-ridehailing