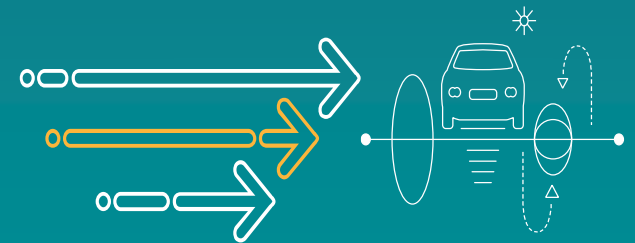


Dr Anthony Thomson
EVS27 – Barcelona, Nov 2013

The Future of Transportation is Electric & Wireless

QUALCOMM HALO™





Agenda

Future of Transportation is Electric and Wireless



**Safety &
Security**



**Wireless EV
Charging**



**Navigation
Services**



**Content
Streaming**



**Mobile
Hotspot**



**Application
Downloads**

Overview of Macro-trends

Global urbanisation

70% of world's population will live in cities by 2050

Infrastructure strain

Total global vehicles increasing from 1.1bn today to 2.5bn by 2050

Air pollution

Legislation and fines for pollution

Health costs

WHO estimates monetized health impact of poor air quality in 2020

€160 billion - €600 billion per year

EVs are Part of the Solution – but Barriers Remain



Electric Vehicles

- Cost
- Limited Range
- Time to Charge
- Ease of

Benefits

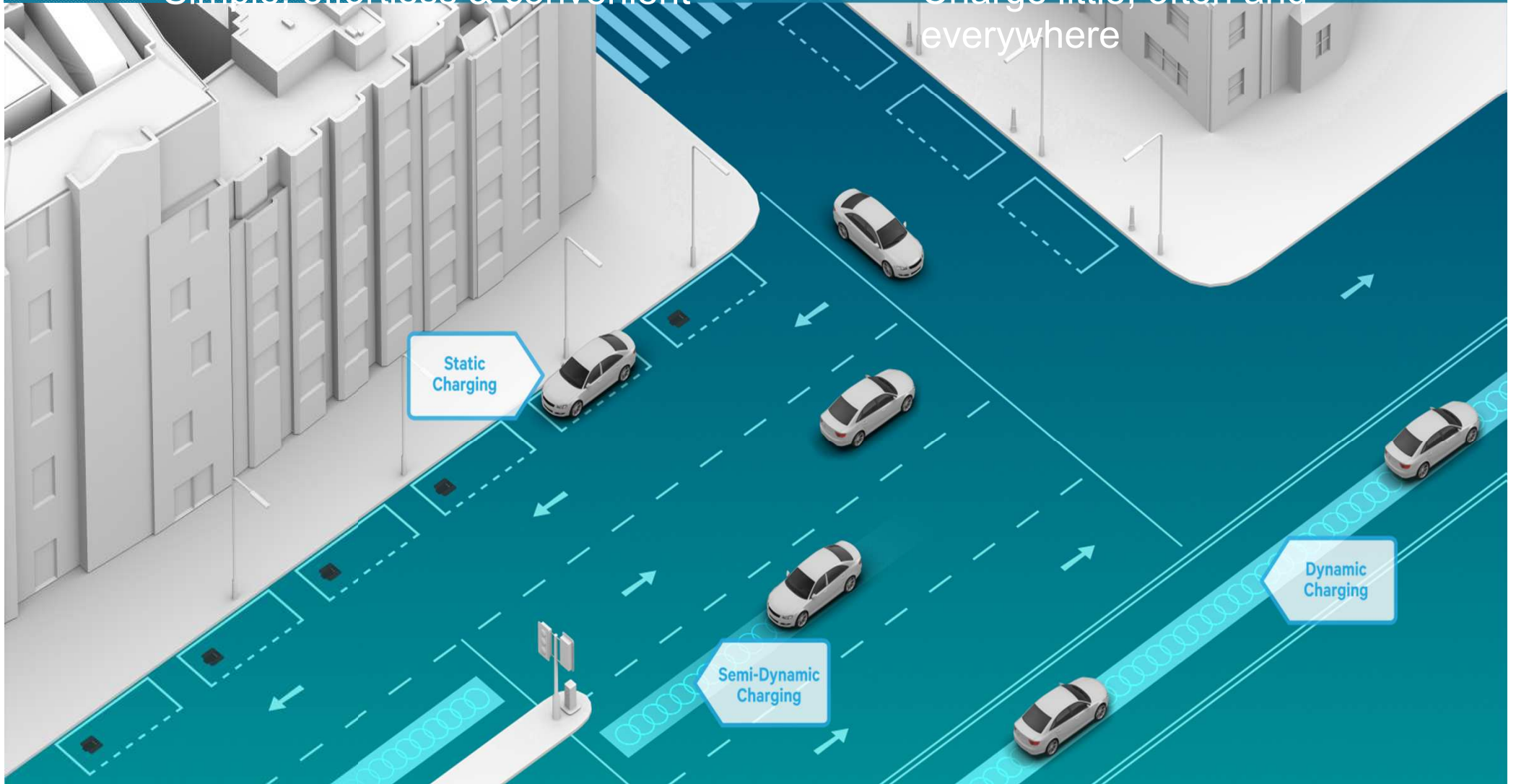
- Better fuel economy
- Non polluting
- Less noise
- Clean Street Technology

Charging Ubiquity

- Infrastructure Lag
- Charging Posts
- Trailing Cables
- Vandalism

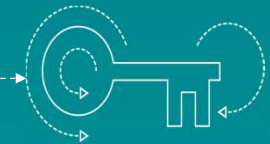
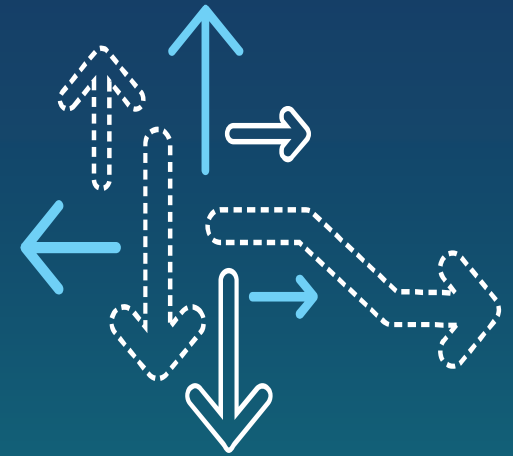
Factors for EV Market Growth – Ease of use

- **Wireless EV Charging meets our needs**
 - Simple, effortless & convenient
- **Multiplicity of charging opportunities**
 - Charge little, often and everywhere



The EV Road Ahead

QUALCOMM HALO™



Electric Vehicles – Wirelessly Charged

The future of transportation

- Resonant Magnetic Induction
- Qualcomm Halo WEVC – an elegant & efficient way to charge EVs
- Charge any EV, any where, any time
- No plug-in cable makes it simple and easy to charge

A System Design Process

Power – Gap – Tolerance – RF – EMC

- Vehicle integration design starts very early with requirements on power, pad size, weight alignment tolerances including vehicle systems & chassis construction to define RF/EMC requirements
- Full simulations and evaluations to ensure compliance to RF limits as defined by ICNIRP

Flexibility

Power Options and Fast Charging

- First decision is, how much power:
3.3kW/6.6kW/20kW?
- Higher power is possible
- To allow a higher “drive-to-charge ratio” drivers will want faster charging at high power
- Higher power
Qualcomm Halo WEVC can deliver more driving range per hour

Standards, Safety & Compliance

Regulations & Requirements

- Qualcomm Halo WEVC supports Foreign Object Detection and Living Object Protection
- Notification to smart phone when charging interrupted
- 14th Nov SAE announced 85kHz as WEVC frequency of operation !

Key Criteria for Wireless EV Charging

New Automotive Technology

- SAFETY –
Must meet Industry Standards
 - Foreign Object Detection
 - Living Object Protection

- COEXISTENCE –
Must not Interfere with other electronic systems
 - On Vehicle
 - Implantable Medical Devices, etc.

- STANDARDS–
Must be agreed by Industry
 - Interoperability
 - Market confidence

- SYSTEM DESIGN
Packaging Volume/Weight
 - Flexible design suitable for multiple vehicle platforms

- EASE OF USE –
Tolerant to Misalignment
 - While retaining compliance
 - No need for automatic parking/ alignment systems

- COMPLIANCE –
RF meets regulatory guidelines
 - X, Y & Z displacements and high power

FIA Formula E Championship

Drive *Very Fast* and Charge –



- The ultimate EV racing series
- Safety cars wirelessly charged with Qualcomm Halo
- WEVC to be offered to teams for 2015 season
- Qualcomm is an Official Founding Technology Partner
- Focus on enabling

Today at 3pm at the Qualcomm Booth we're hosting an EV Racing Technology Forum with Qualcomm/FEH/Drayson – ALL WELCOME !

Qualcomm Technologies, Inc.

- See the Race car at

Thank you

Follow us on : 

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