Movilidad eléctrica:
Oportunidades para América Latina

Gianni López

Director

Centro Mario Molina Chile

Centro Mario Molina Chile

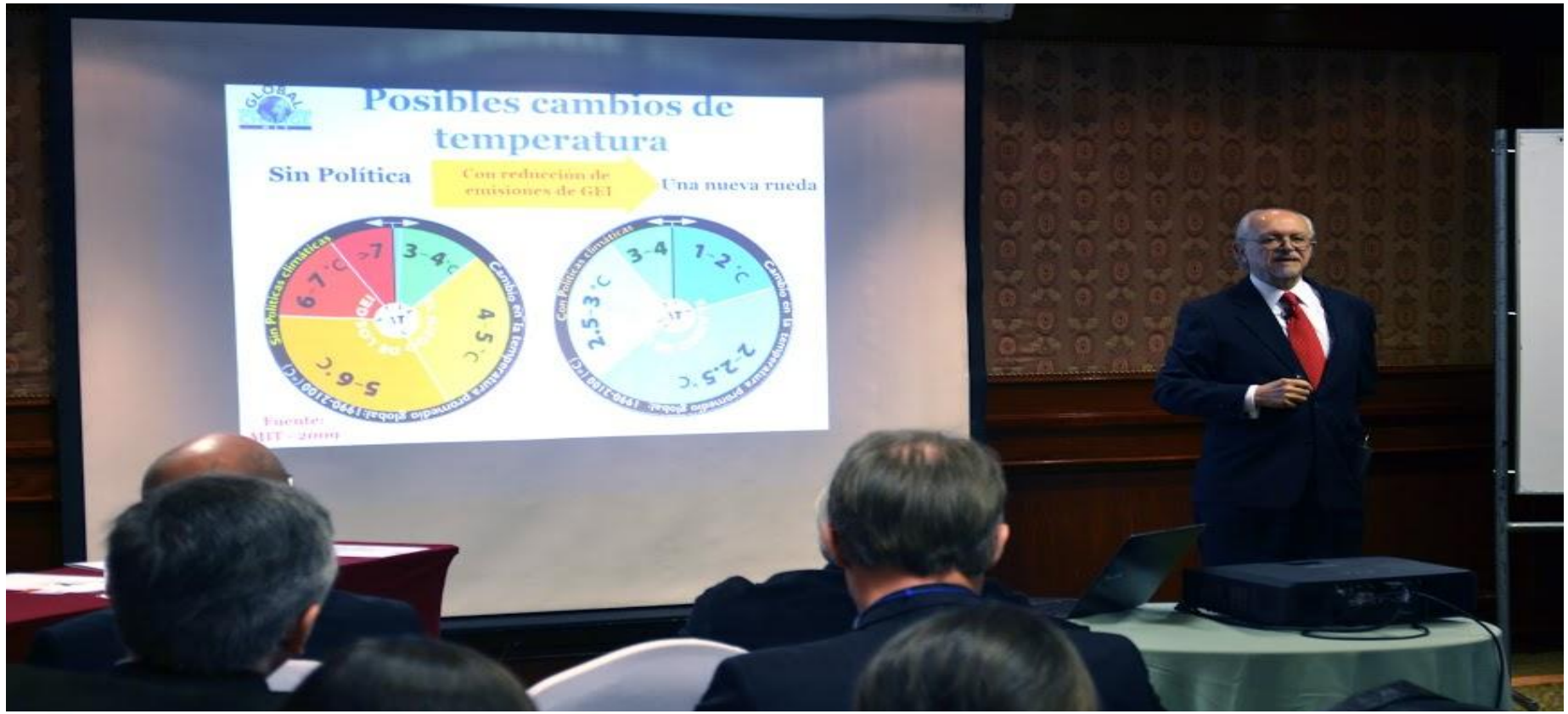
- CMMCh is a private institution created in 2004 under the sponsorship of Nobel Prize Professor Mario Molina;
- Its mission is to create capacities in South America to address the problem of air quality and climate change;
- Is a R&D Center under CORFO Law for the promotion of private investments in R&D;
- Is dedicated to research and studies in air pollution and energy in South America, and is the top one center in Latin America in scientific papers publication in this topic;
- Rise funds from private companies, governments and international institutions;

Centro Mario Molina Chile

- Run projects in Chile, Peru, Paraguay, Uruguay, Costa Rica and Brazil, and capacity building at regional level in Latin America.
- Works in close relation with universities and research centers in USA, Norway, Sweden, Demark and Finland.
- Has agreements with UNEP to implement Global Regional Programs inLatin American Region:
  - Partnership for Clean Fuels&Vehicles
  - Global Fuel Economy Initiative
  - Cimate and Clean Air Coalition
- CMMCh is taking part in the Advance Motor Fuel Implementation agreement of the International Energy Agency

Centro Mario Molina Chile

- CMMCh has developed in-house professional and instrumental capacities for air quality research;
- CMMCh has a formal relation, under UNEP and IDB programs and projects, with Transport Ministry Vehicle Emission Lab (3CV) for R&D in transport technology and energy.
- CMMCh is member of CTCN network



Centro Mario Molina · Chile

GFEI
GLOBAL FUEL ECONOMY INITIATIVE

UNEP

GEF

CCAC
CLIMATE AND CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

Latin America and Caribbean Regional Conference for New Approaches in Cleaner and Efficient Vehicles

Climate and Clean Air Coalition

Santiago - Chile, July 31st, August 1st of 2013 Regal Pacific Hotel

Advance R&D in Energy and Atmosphere

Health and Environmental Impact of Exhaust from Biofuel Study

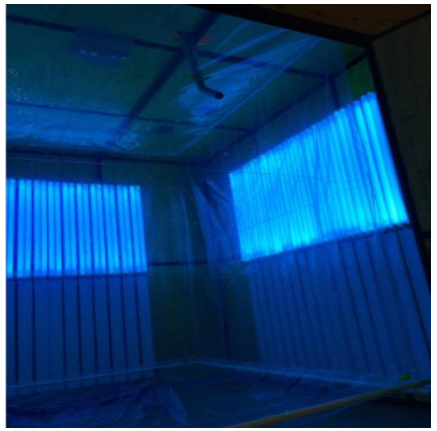
Ministerio de Transportes y Telecomunicaciones
Gobierno de Chile

Centro Mario Molina • Chile

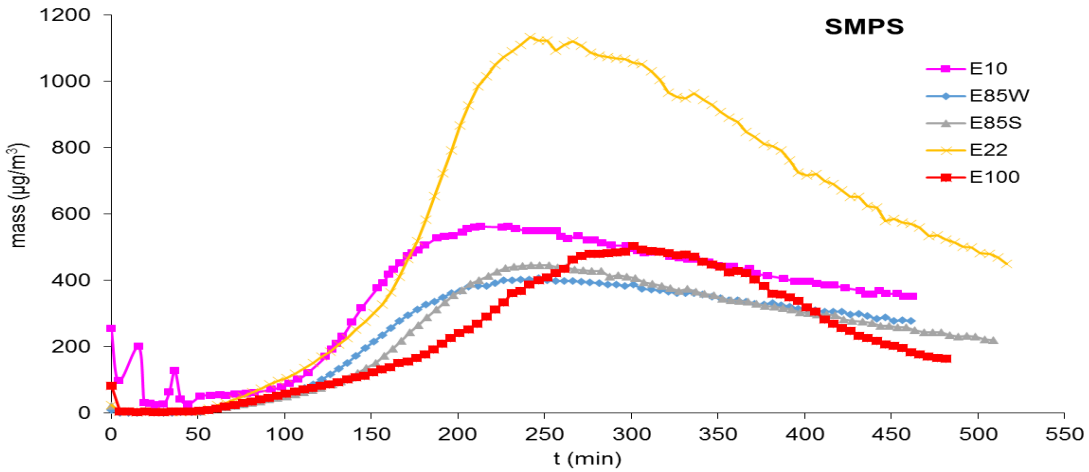
BID

HARVARD
SCHOOL OF PUBLIC HEALTH
Powerful ideas for a healthier world

Photochemical chamber



Vehicle Type	Seasons	Fuel Blends
Flex Fuel Car	Summer	Gasoline
		10% Ethanol
		85% Ethanol
	Winter	Gasoline
		10% Ethanol
		85% Ethanol
Flex Fuel Car	All	100% Ethanol
		25% Ethanol

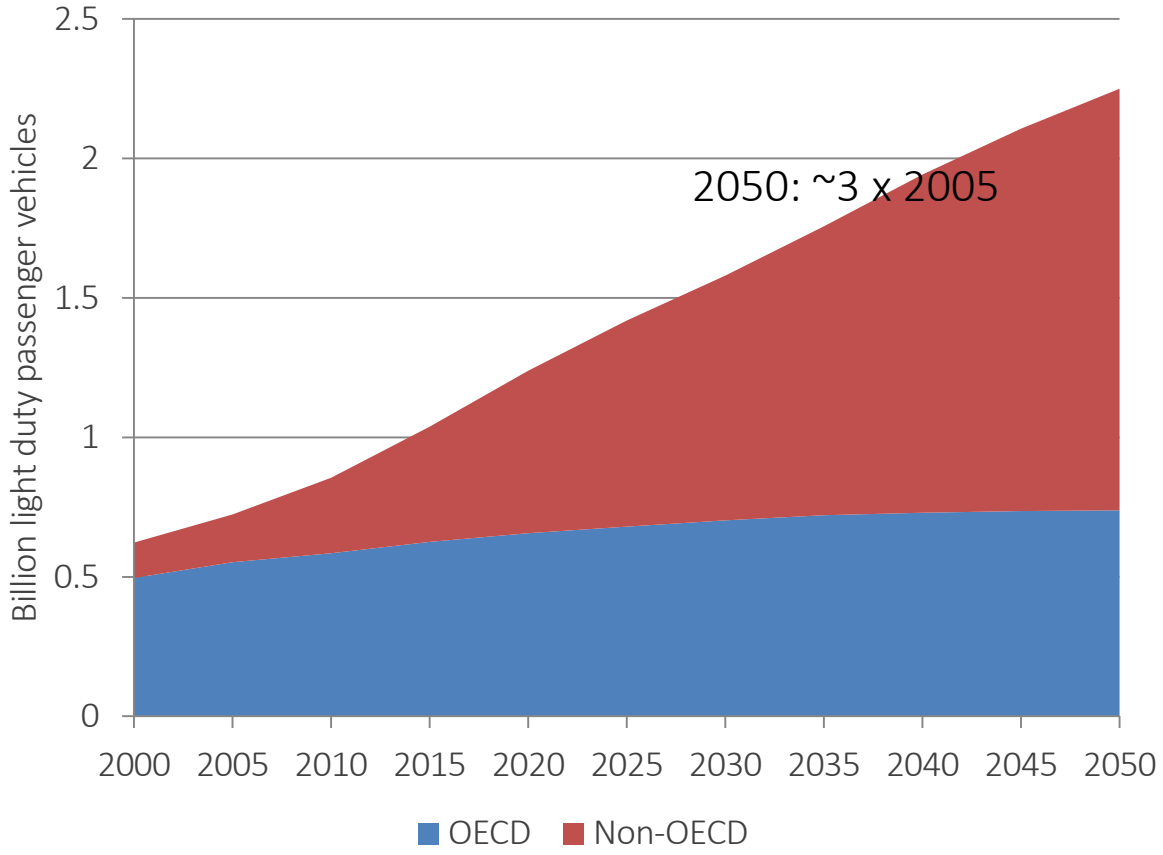


Chamber particle mass concentration

Movilidad eléctrica – Oportunidades para la región Latinoamericana

Flota global de vehículos se triplicará en 2050

- **890** millones hoy… más de **2,500** millones en **2050**
- **90%** del crecimiento en **países emergentes y en desarrollo**
- Oportunidad para la promover **innovación**

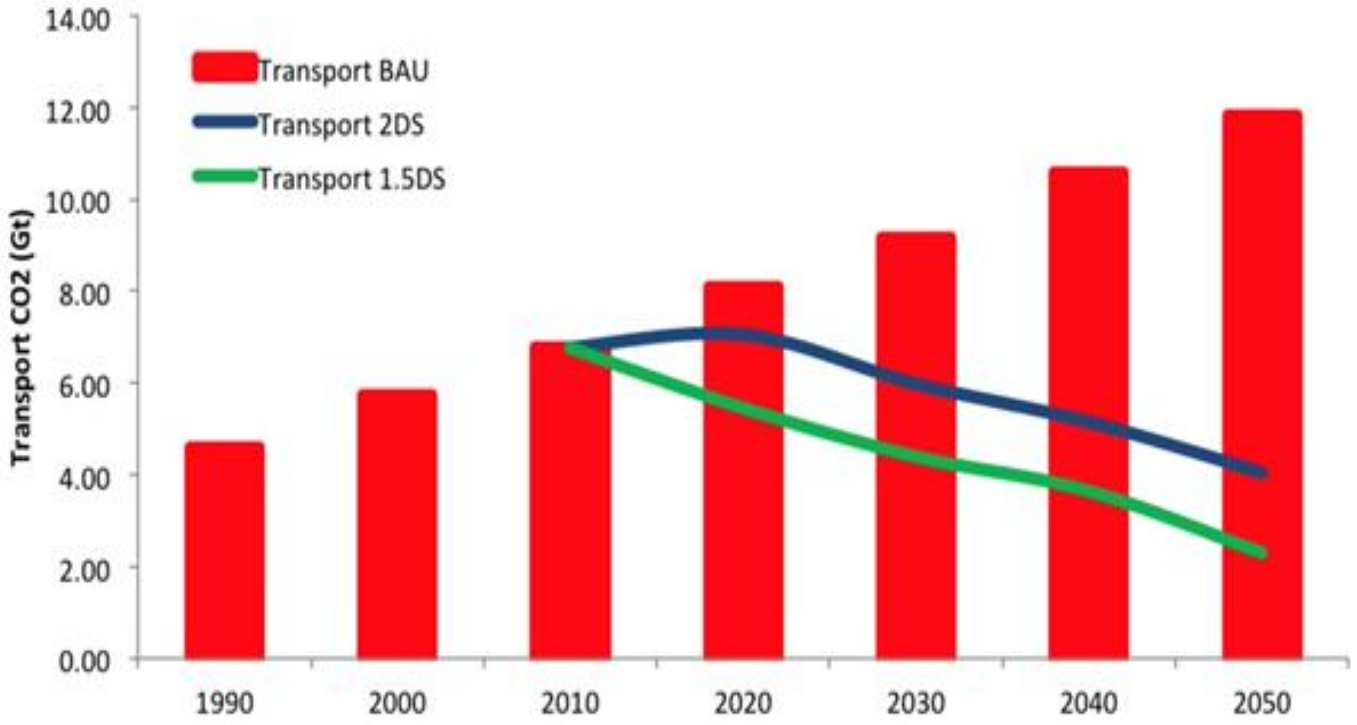


- Motorización baja en USA y Europa
- América Latina entre continentes con mayor aumento de motorización
- Pocos países tienen estrategias para preparar este escenario

Fuente: IEA, 2012

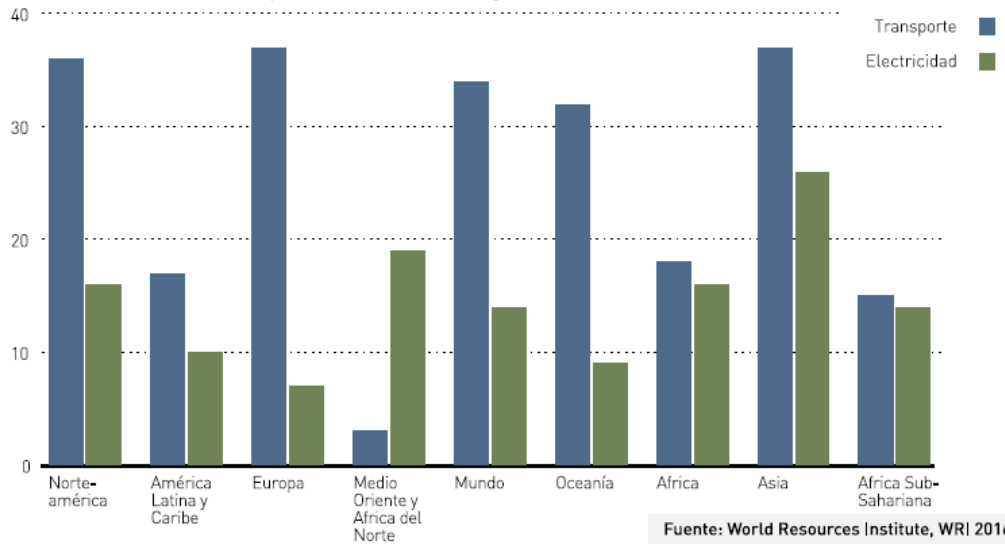
Escenarios de emisiones de CO2 en el transporte

- Las emisiones transporte ponen objetivos del **Acuerdo Paris en riesgo**
- Necesario un cambio de **paradigma** social, **nuevas políticas** y **tecnologías**



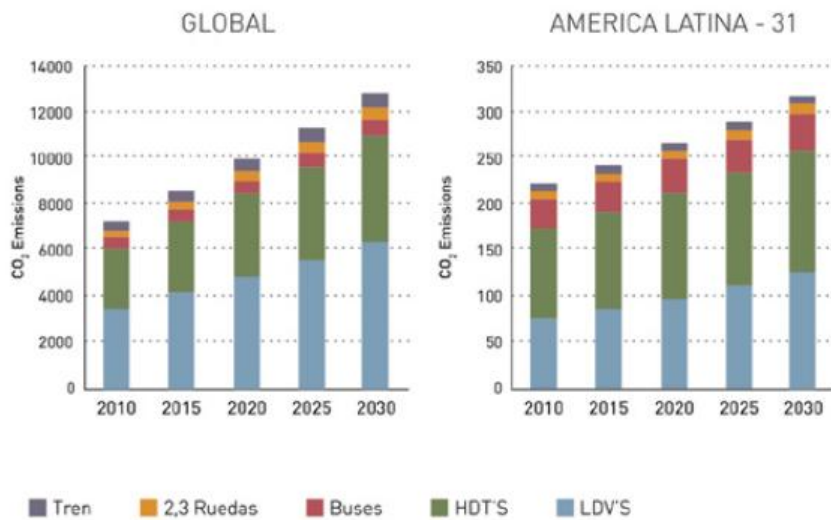
Fuente: Overview of INDC, Gota S. et al, 2015.

Emisiones por sector a nivel regional

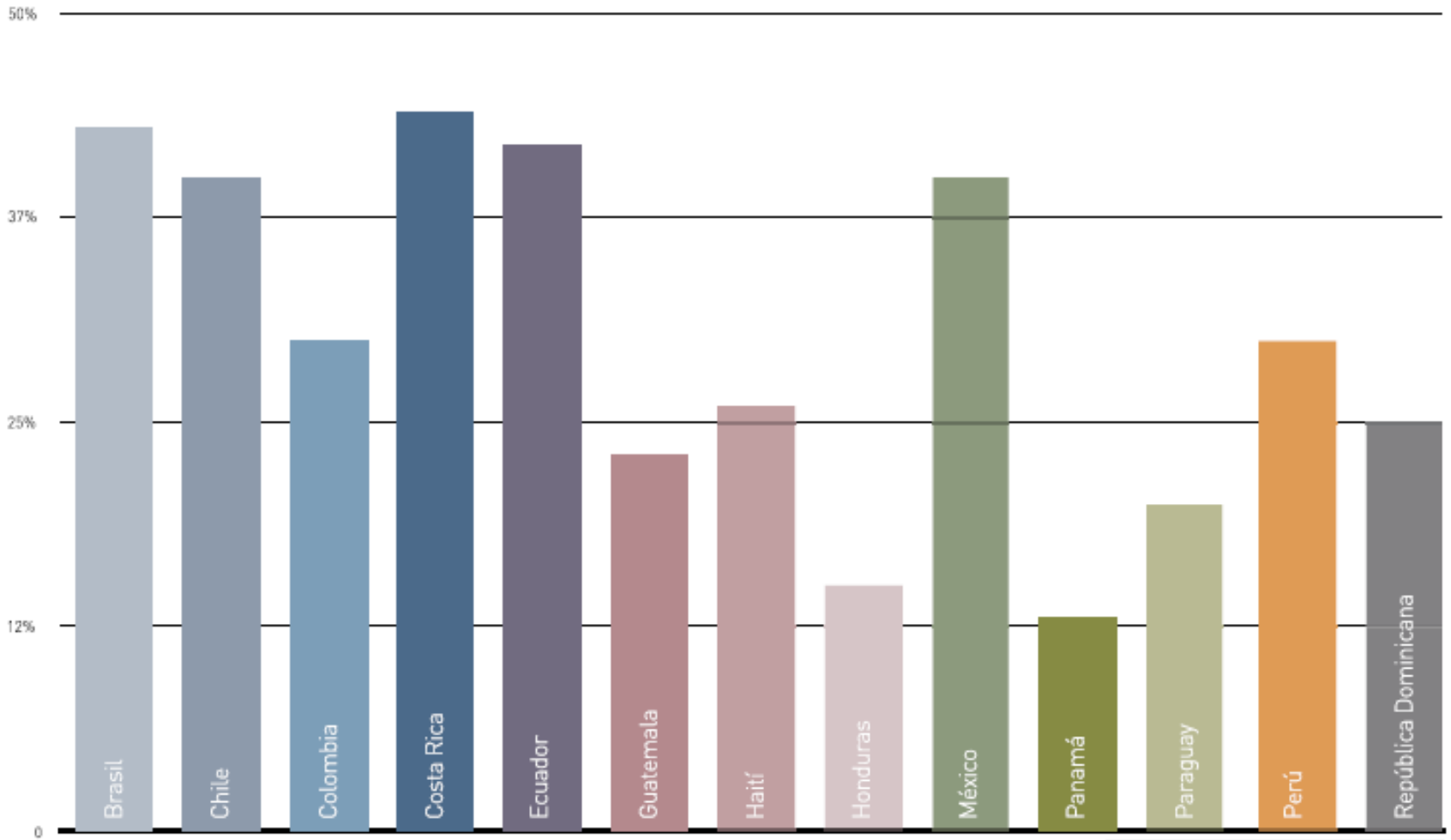


Fuente: World Resources Institute, WRI 2016

Emisiones del sector transporte por región y tipo de vehículo



Compromisos nacionales de reducción de gases de efecto invernadero[9]



Fuente: Elaboración propia

Combustibles fósiles: implicaciones para la salud

- Contaminación del aire en México estimada en 39,000 millones US$ en costos de salud (OCDE, 2010)
- 1/2 atribuidos al sector transporte (OCDE, 2010)
- Principales contaminantes en transporte asociados al uso del diésel (WHO)

Fuentes: Carbono Cero América Latina, UNEP-DTU,2015, OCDE, 2010

Future Mobility
Electrified, automated and connected

costs hybrid e-motor
eBike power electronics

electrified

plug-in eScooter range
fun-to-drive battery
charging infrastructure

legislation driver assistance
emergency braking autopilot

automated

highway-pilot
redundancy sensors
valet parking electric steering

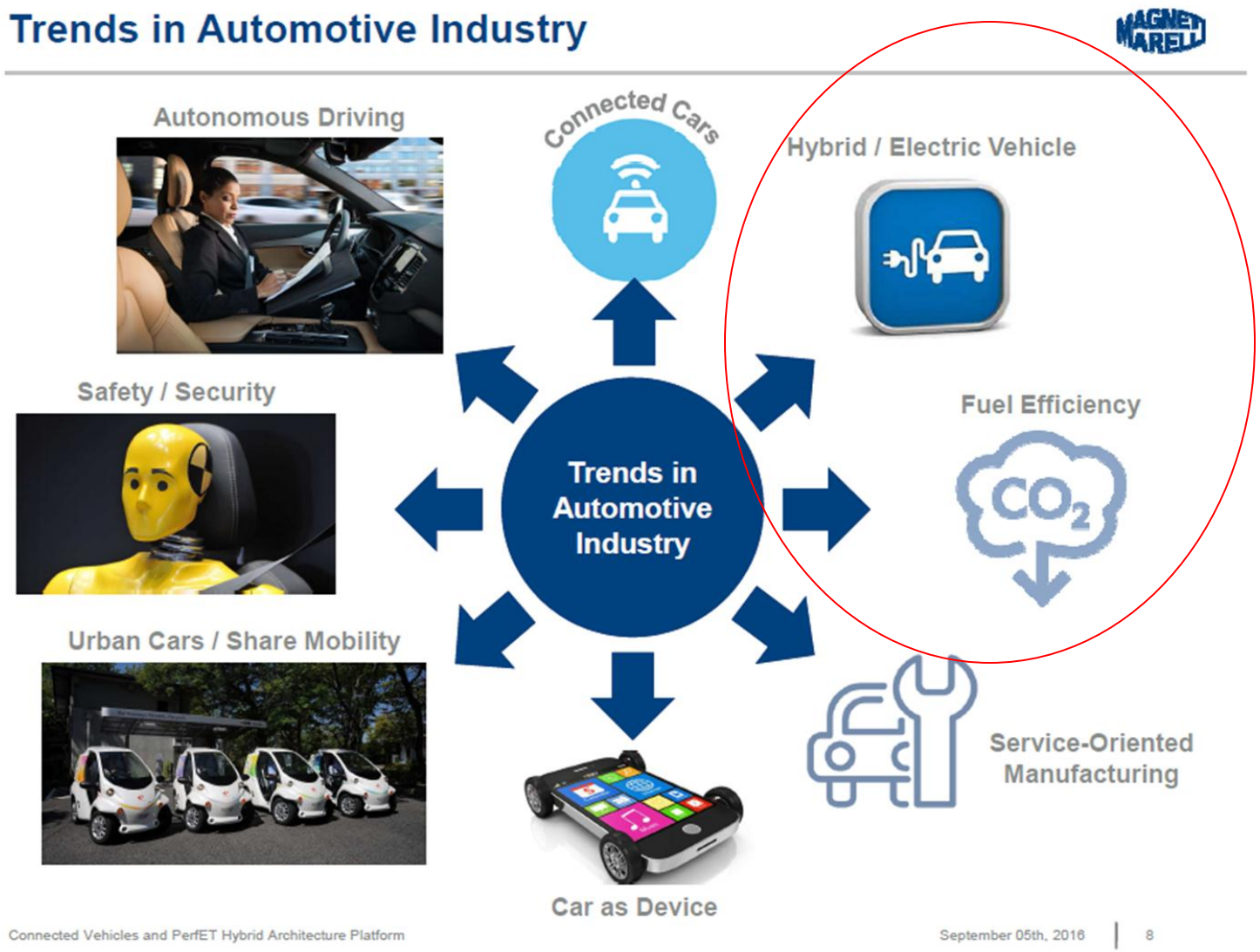
electronic horizon
smartphone integration

connected

eCall cloud
services fleet management
car2car augmented reality

BOSCH

Tendencias en la industria automotriz



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Home / News / Electric Cars / Tesla software update fixes flaw found by Chinese white-hat hackers

Tesla software update fixes flaw found by Chinese white-hat hackers

Stephen Edelstein 34 Comments | 1,608 views | Sep 21, 2016

2016 Tesla Model S

THE END OF DIESEL Will diesel cars disappear? Renault predicts the end of old school fuel

French car manufacturer expects diesel engines to disappear from most of its European cars

BY LAURENCE FROST AND GILLES GUILLAUME 6th September 2016, 5:13 pm

SHARES

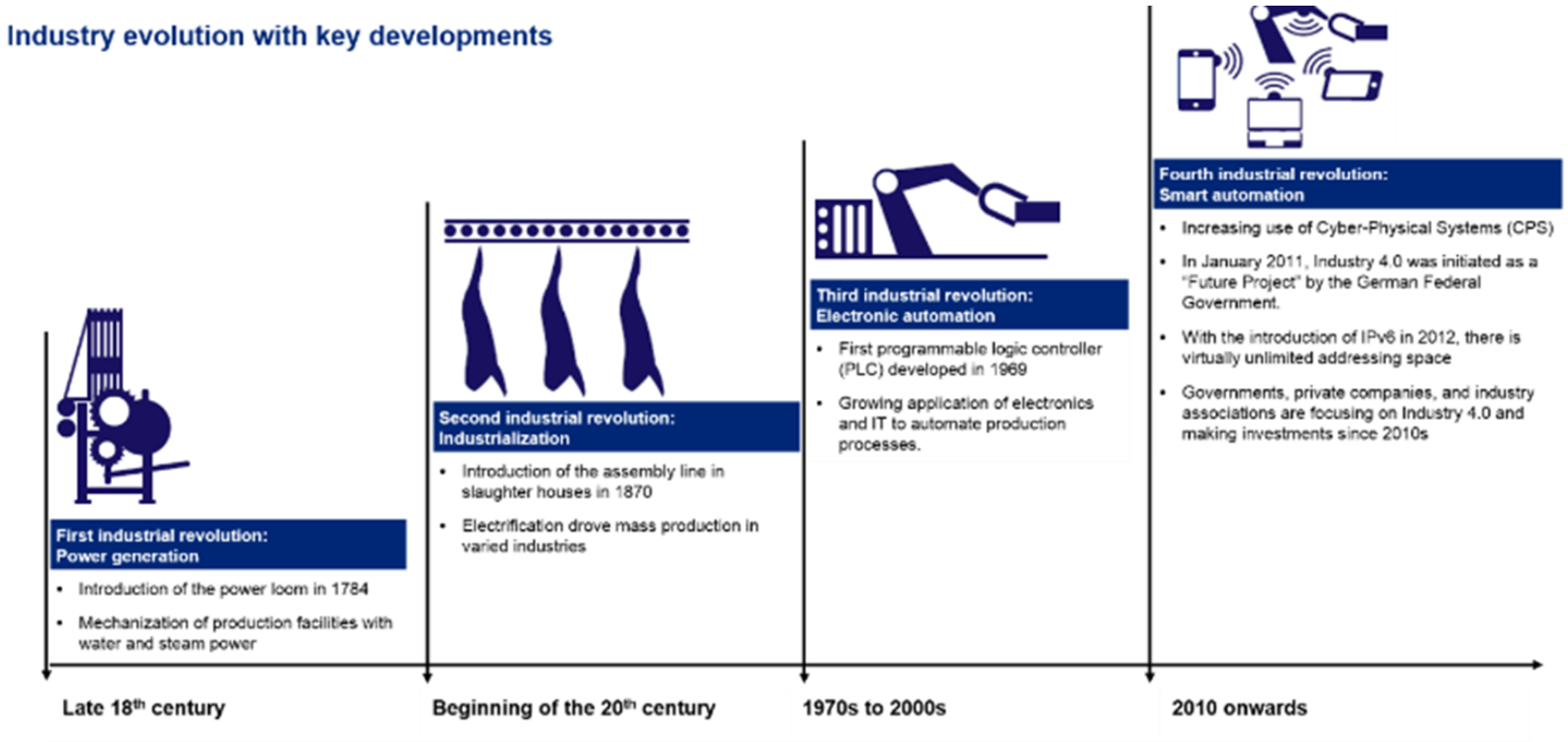
COMMENT 0W

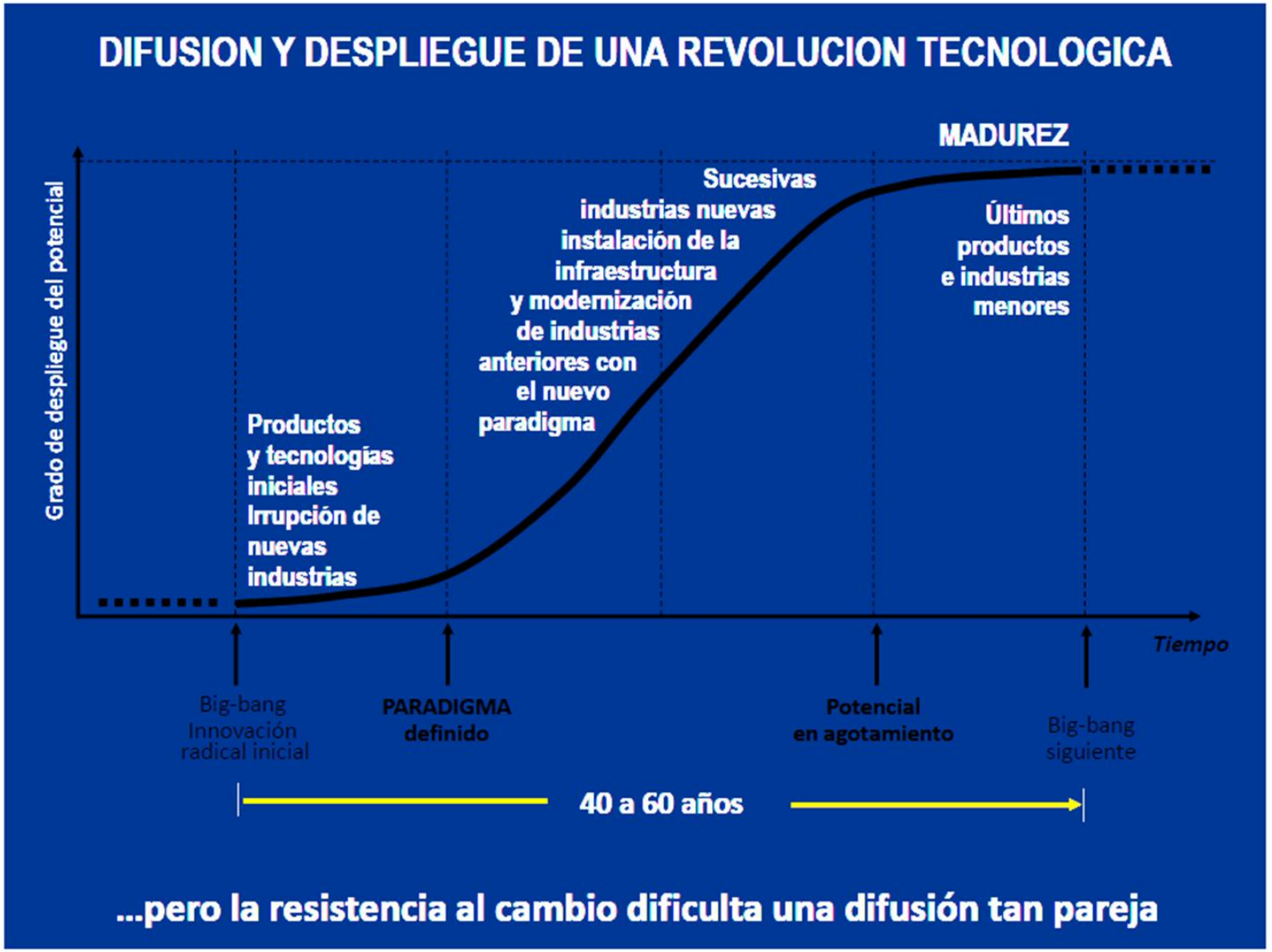
The end of diesel engines could be in sight after one the world's biggest manufacturers said it planning to remove from many of its motors.

Renault expects diesel engines to disappear from most of its European cars, sources inside the firm told Reuters, after the French automaker reviewed the costs of meeting tighter emissions standards following the Volkswagen scandal.

The sober reassessment was delivered at an internal meeting before the summer break. It shows how, a year after VW admitted engineering software to cheat U.S. diesel emissions tests, the repercussions are forcing major European carmakers to rewrite strategic plans that will shape their futures for years to come.

Cuarta revolución industrial




DIFUSION Y DESPLIEGUE DE UNA REVOLUCION TECNOLOGICA
MADUREZ
Grado de despliegue del potencial
Productos y tecnologías iniciales Irrupción de nuevas industrias
Sucesivas industrias nuevas instalación de la infraestructura y modernización de industrias anteriores con el nuevo paradigma
Últimos productos e industrias menores
Tiempo
Big-bang Innovación radical inicial
PARADIGMA definido
Potencial en agotamiento
Big-bang siguiente
40 a 60 años
...pero la resistencia al cambio dificulta una difusión tan pareja

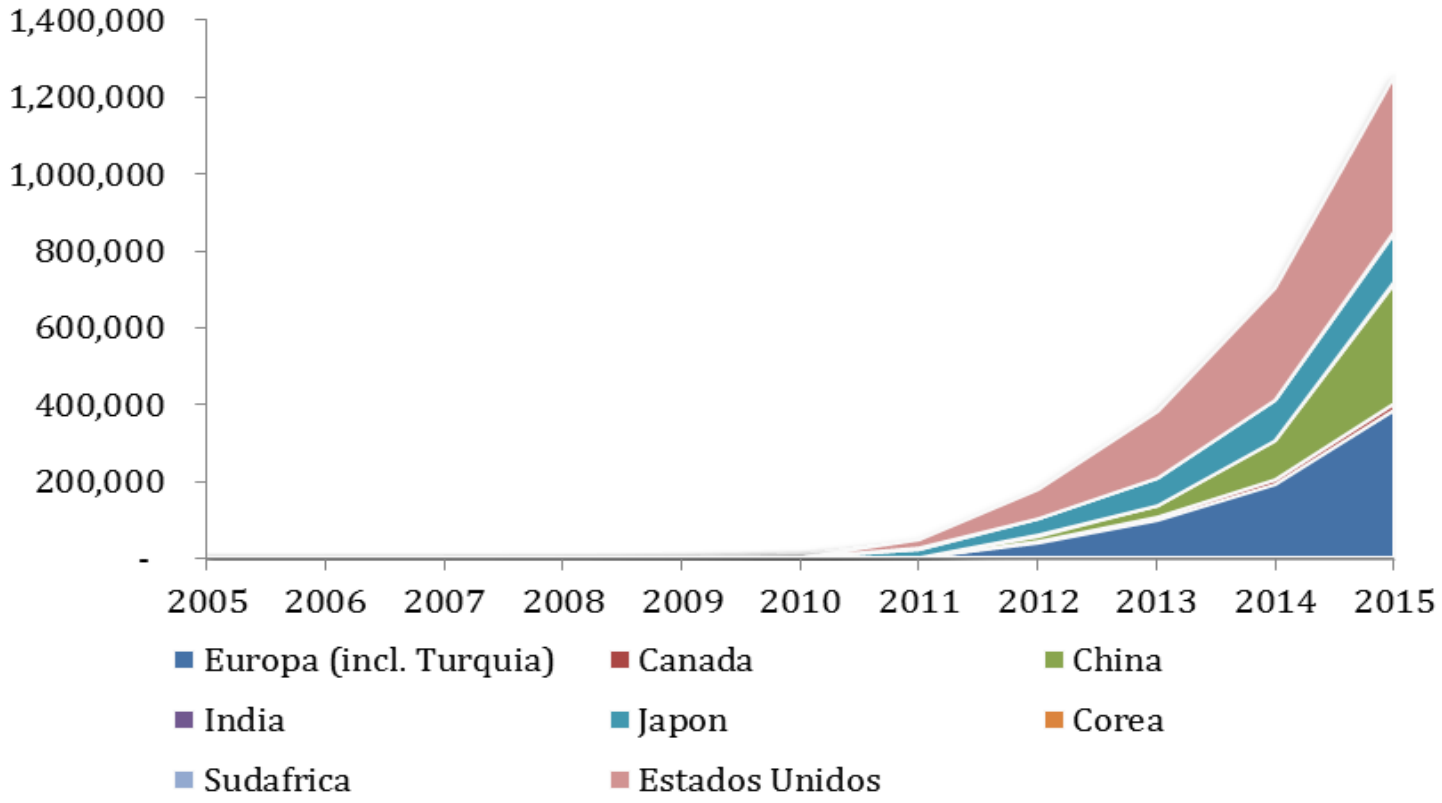

EL DOBLE CARÁCTER DE CADA REVOLUCION TECNOLOGICA
NUEVAS INDUSTRIAS LIDERES
NUEVO PARADIGMA PARA TODOS
PRODUCTOS, INDUSTRIAS E INFRAESTRUCTURA NUEVOS
TECNOLOGÍAS GENÉRICAS Y NUEVOS MODELOS ORGANIZATIVOS
EXPLOSIÓN de industrias y empresas nuevas
MODERNIZACIÓN y elevación de la productividad de todo el aparato productivo
Un nuevo sentido común para la innovación y la eficiencia
OTRO PARADIGMA TECNO-ECONÓMICO Y ORGANIZATIVO

¿Qué oportunidades tiene la región frente a esta transformación tecnológica?

- En reducción de las emisiones
- En eficiencia energética
- En desarrollo económico

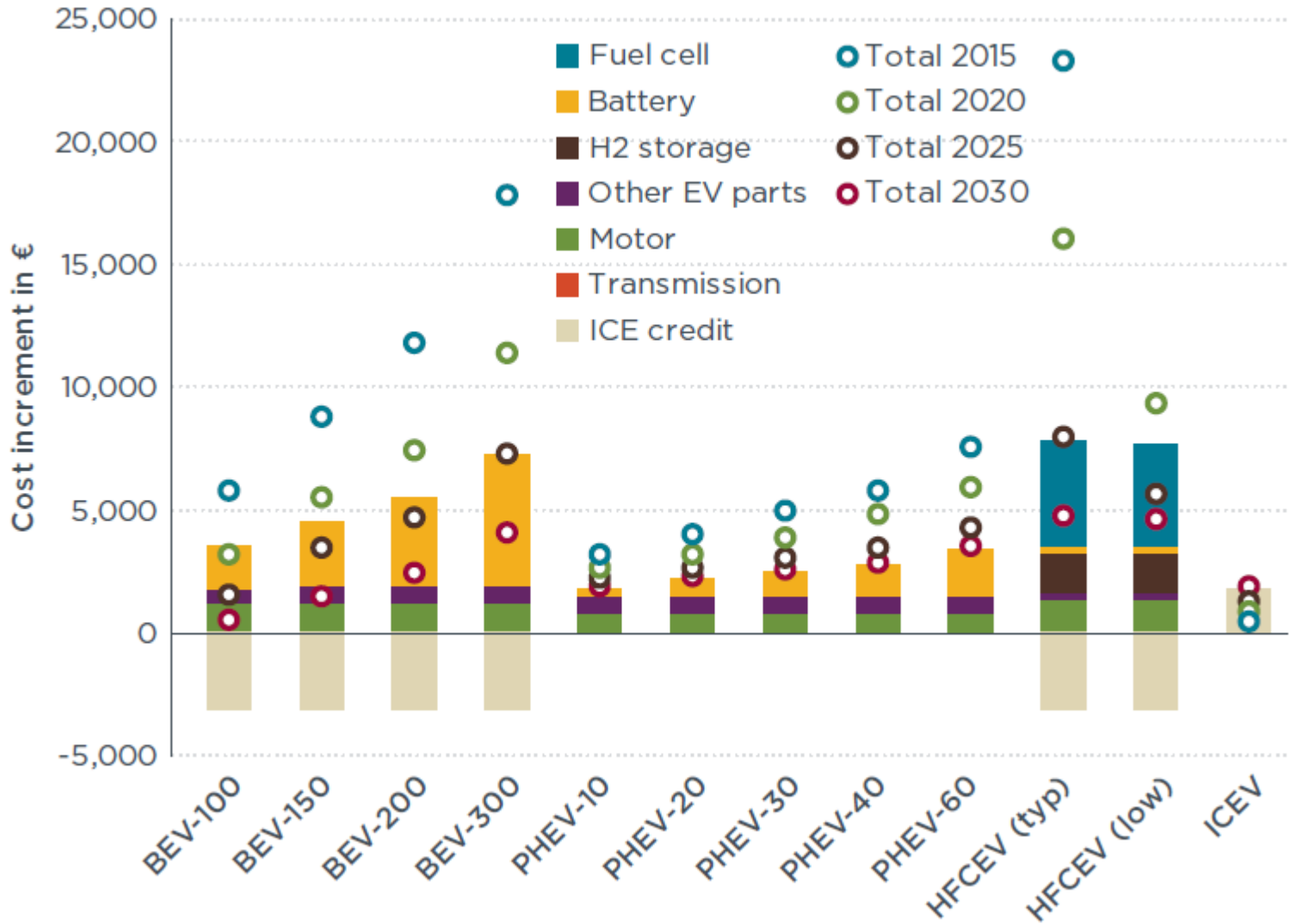
Mercado global de vehículos eléctricos

- 2015: 1,3 millones VE
- x 100 número de VE en 2010
- 90% ventas: China, USA, Holanda, Noruega, UK, Japón, Alemania y Francia
- Drivers: políticas/incentivos, conciencia ambiental y reducción costo baterías



Fuente: IEA, 2016

Costo incremental de un EV respecto de un vehículo convencional al 2030 - ICCT

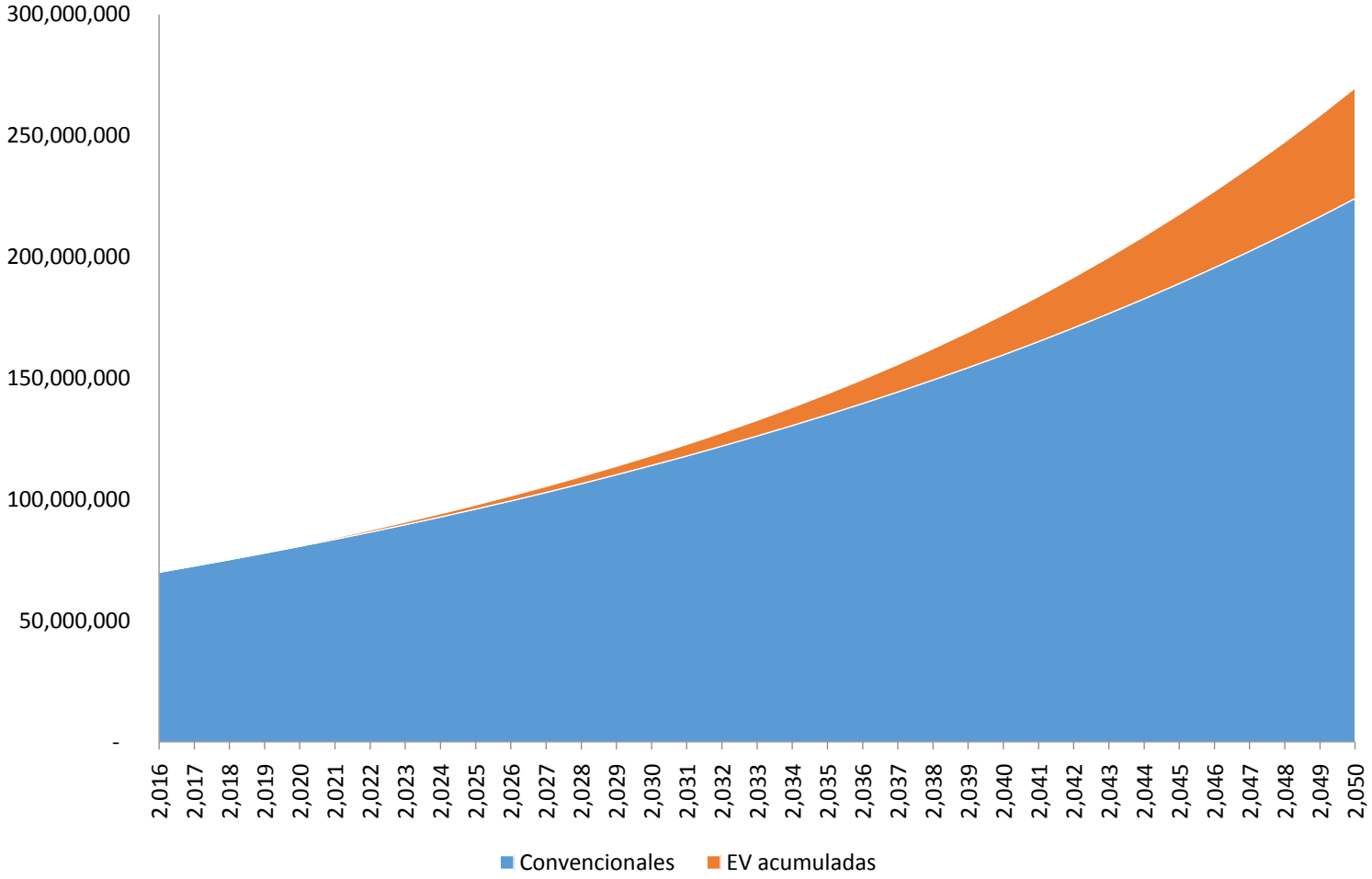


Mercado de vehículos eléctricos en America Latina

- Existen varios incentivos fiscales y no fiscales a nivel de pais en America Latina que buscan promocionar la movilidad electrica

Incentivo/País	Argentina	Brasil*	Colombia	Costa Rica**	Chile	Ecuador	México	Uruguay
Exención de IVA		✓	?			✓		
Exención de permiso de circulación		✓		✓			✓	
Exención de programas de restricción vehicular			✓	✓	✓		✓	
Exención de impuestos aduaneros			✓	✓		✓		✓
Exención de impuesto a consumos especiales				✓		✓		
Tarifa eléctrica diferenciada					✓	✓	✓	
Exención de impuesto ambiental					✓	✓		

Flota de EVs con politicas de promocion puede alcanzar los 4M vehículos en 2030, 45M en 2050



Los vehículos eléctricos reducen emisiones del sector y aumentan el ahorro en combustibles

- La introducción de VEs permite limitar este incremento a 258%, gracias a una reducción de 1,4 Gton de CO_2 en todo el período 2016-2050.
- **Los beneficios en ahorro de combustibles alcanzan a 85 mil millones de dólares para el periodo 2018-2050.**

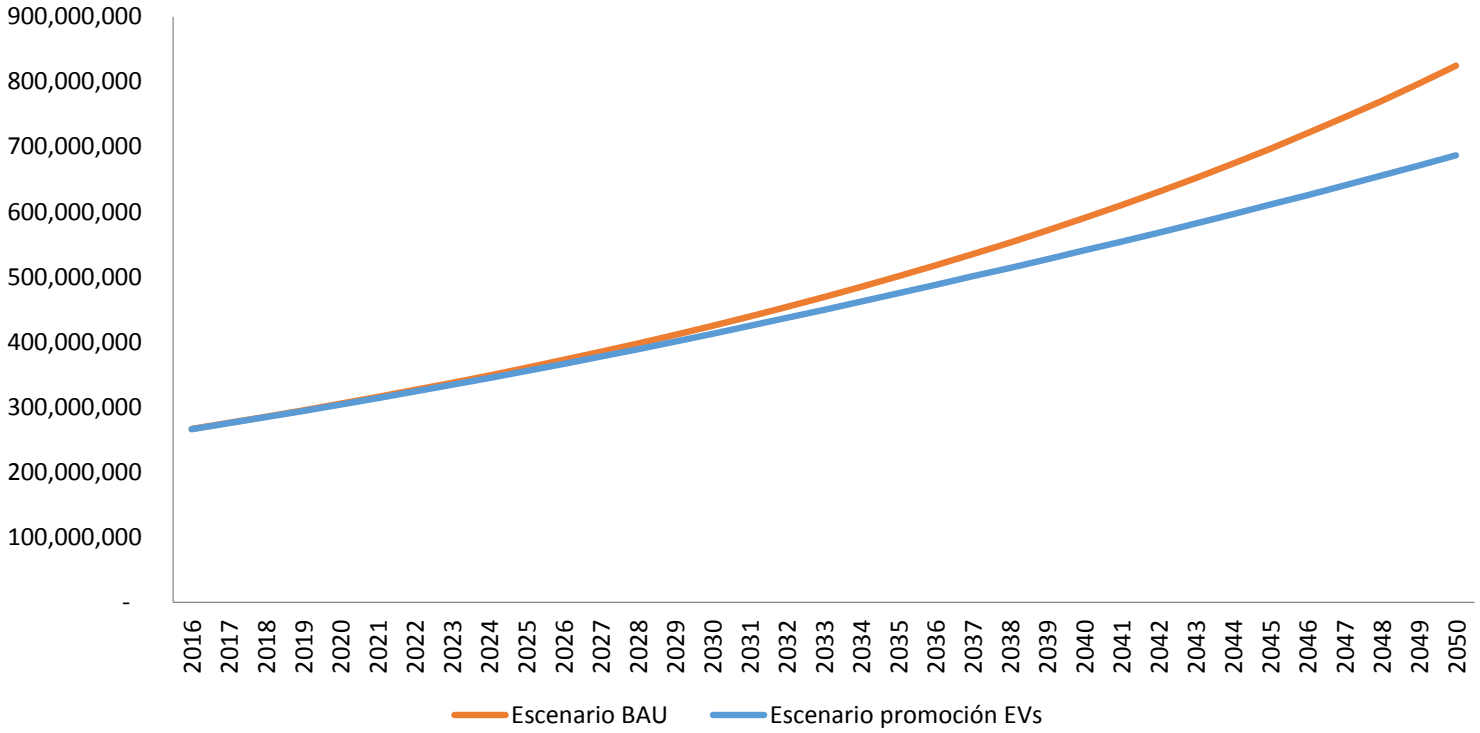
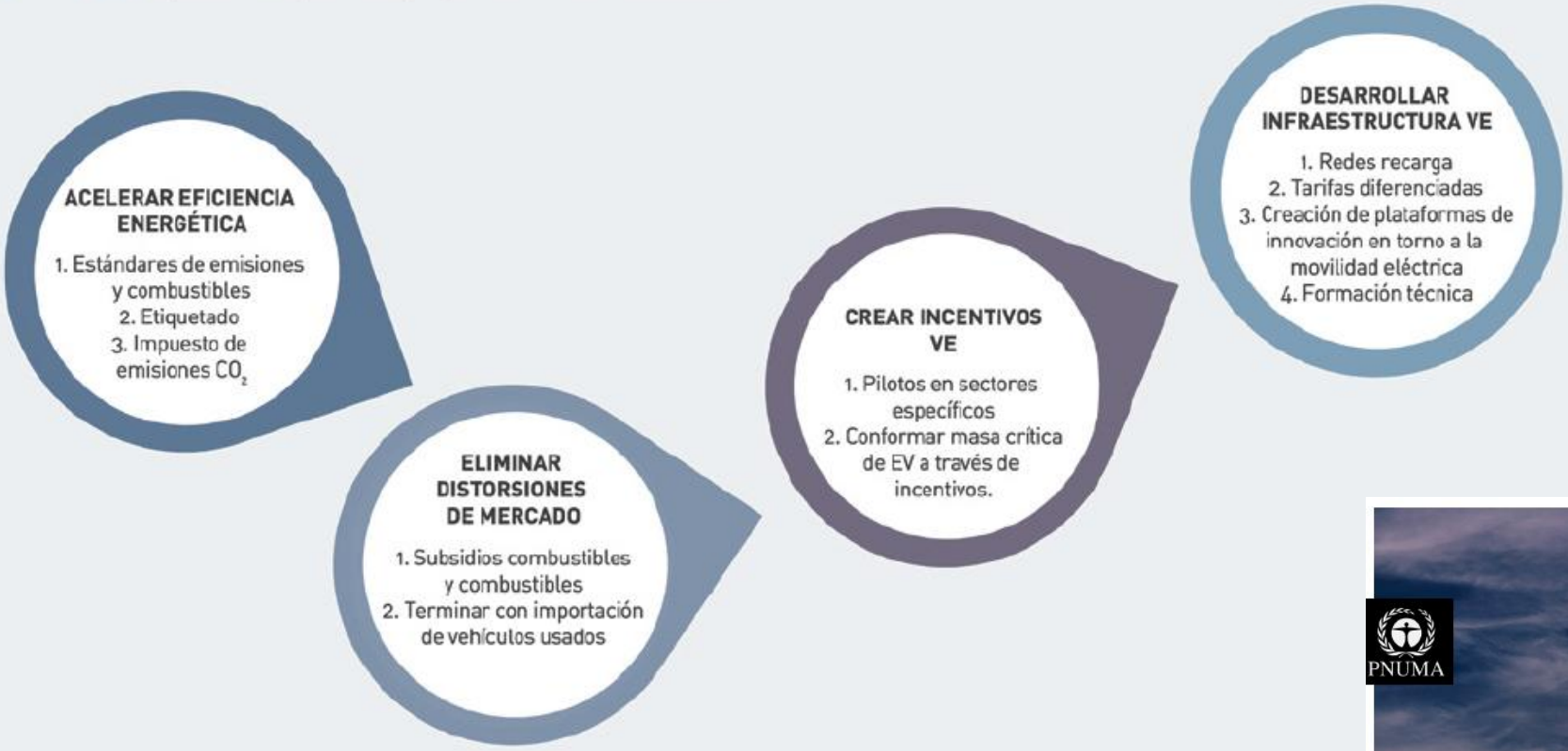
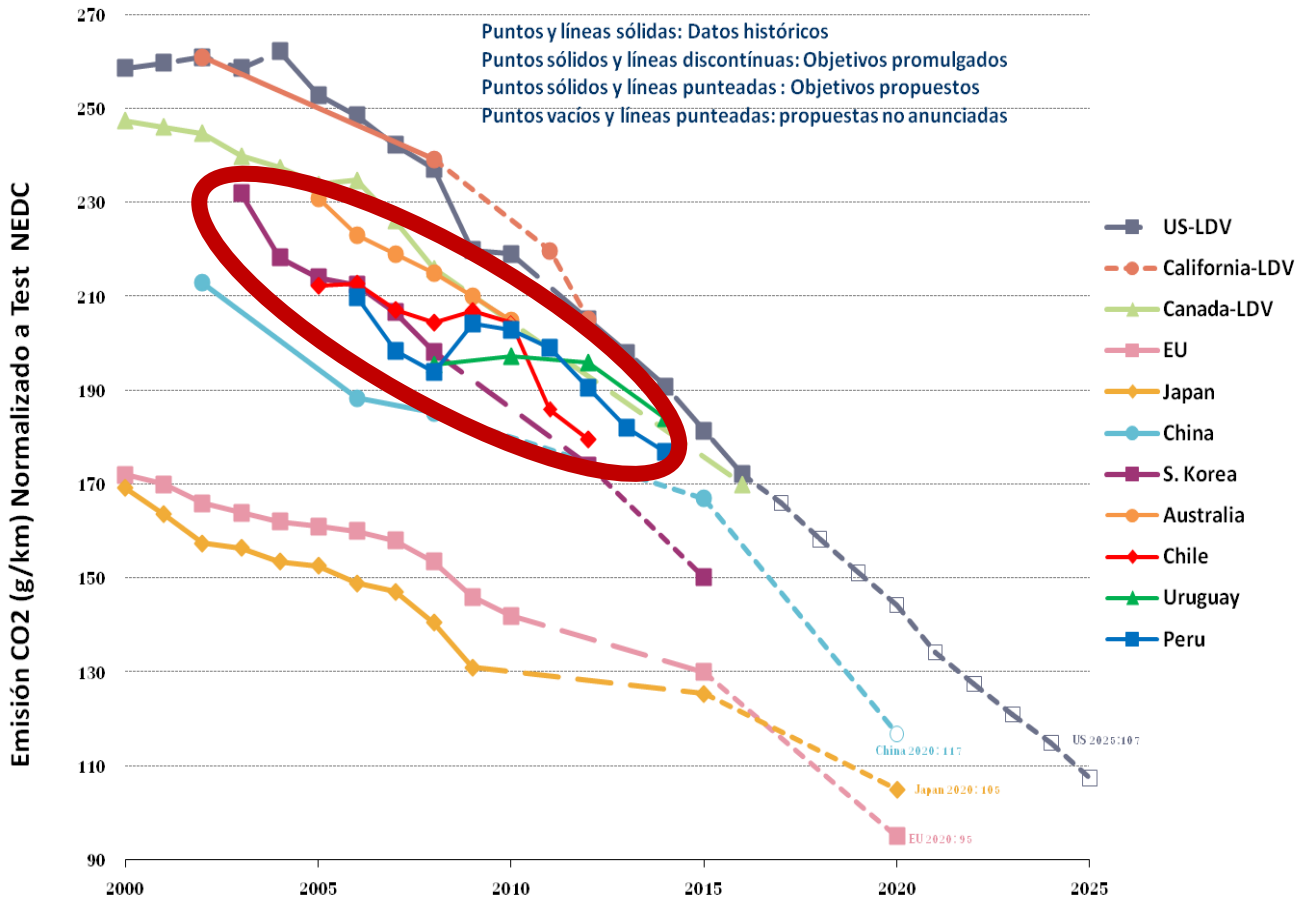


FIGURA 31 Hoja de ruta para despliegue de la movilidad eléctrica



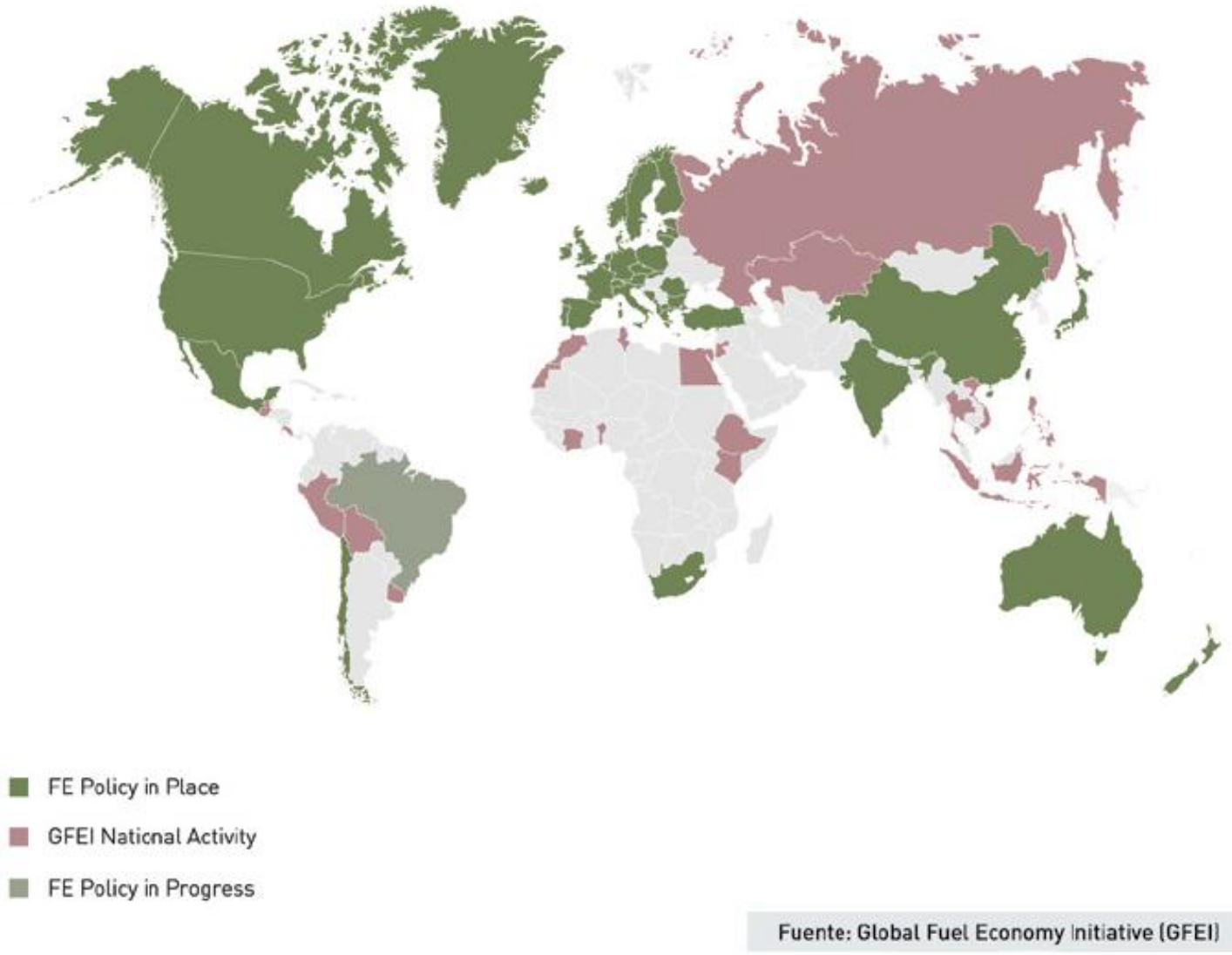
Emisiones CO2 por km recorrido: baja eficiencia en América Latina



[1] El Objetivo de China correspondeal escenario de la flota a gasolina. Si se incluye otro tipo de combustible, el objetivo sería más bajo.
[2] Estados Unidos y Canadá light-duty vehicles incluyen light-commercial vehicles.

Fuente: UNEP, 2016

Normas e iniciativas para mejorar la eficiencia energética en el sector transporte (GFEI 2016)

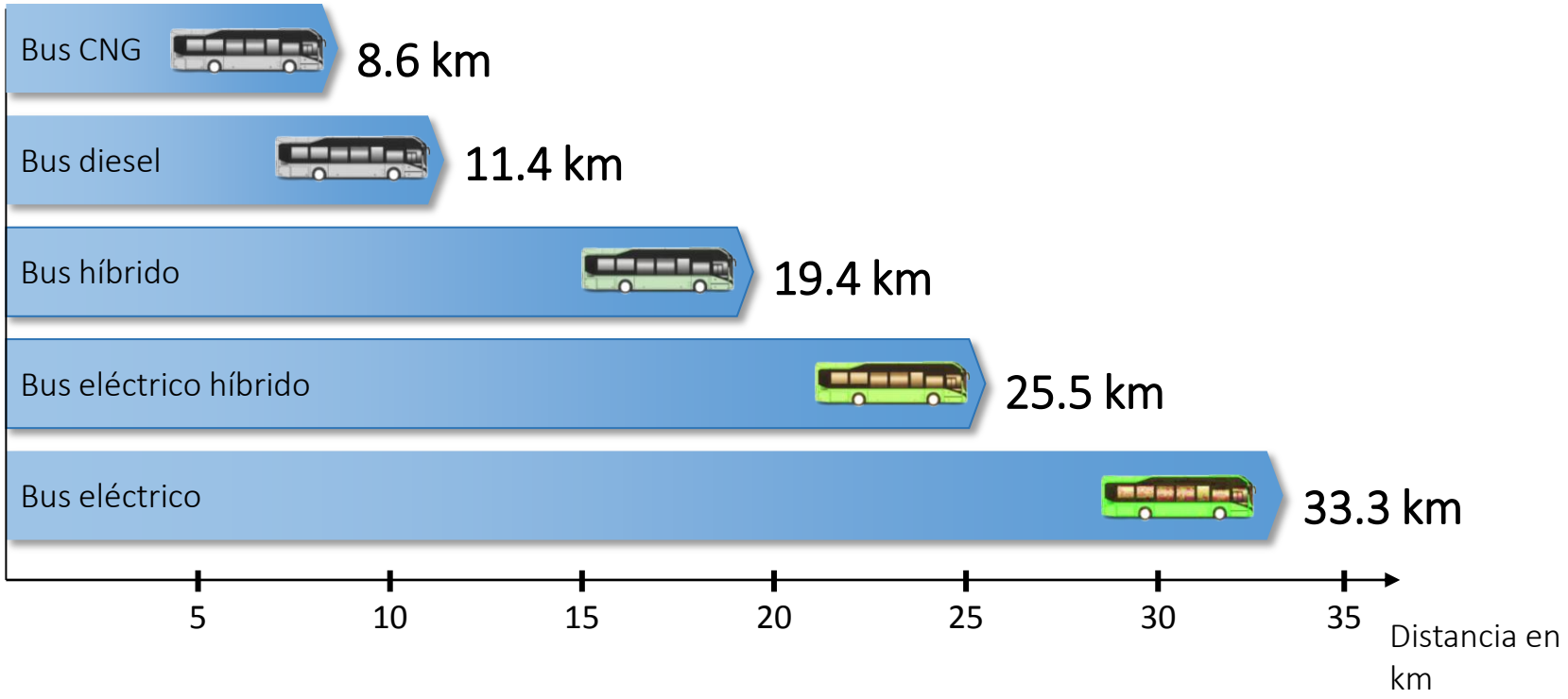


Fuente: Global Fuel Economy Initiative (GFEI)

Transporte publico eléctrico: prioridad estratégica en la región

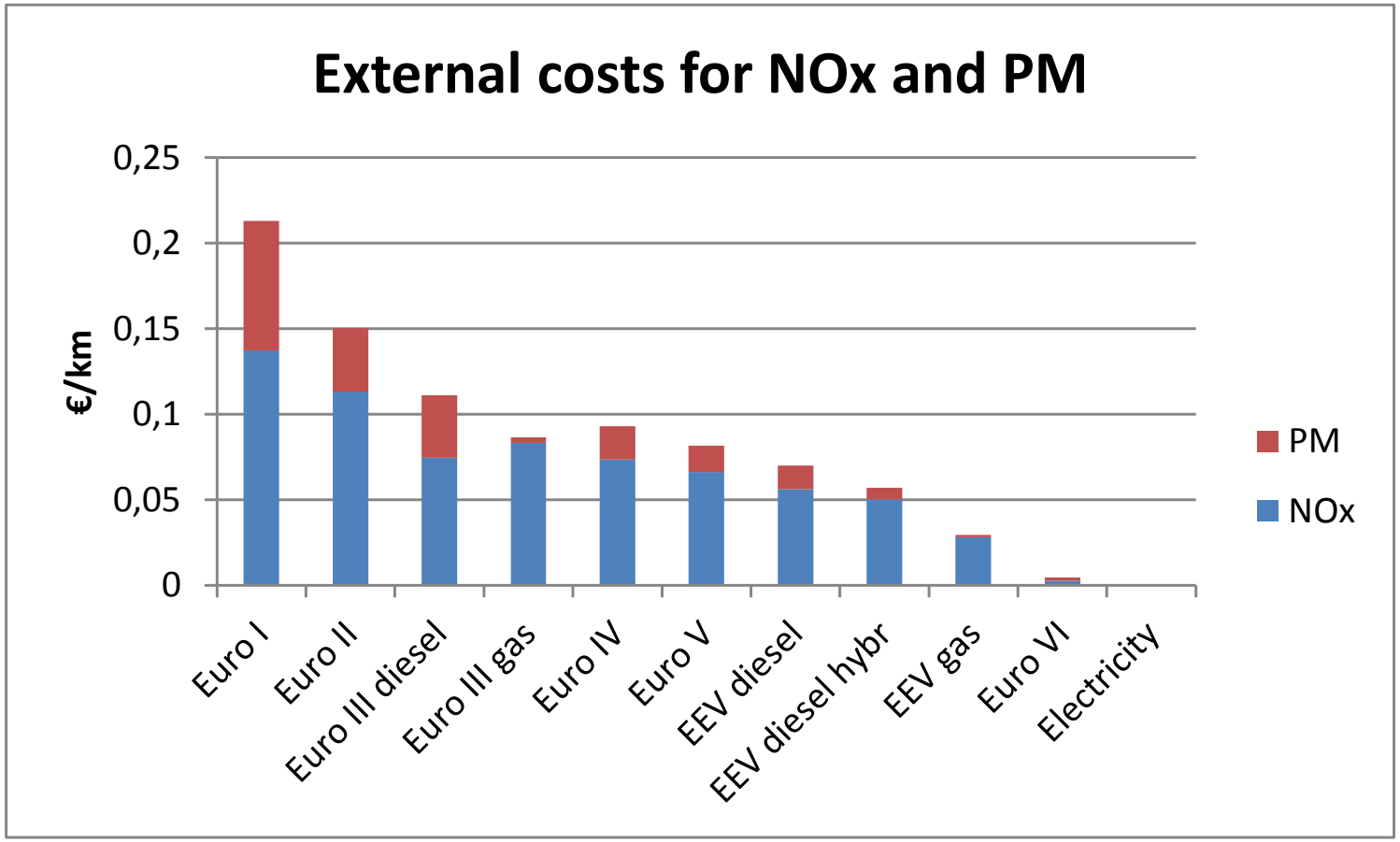
Escala de eficiencia de buses: …and the winner is?

- Uso de la energía por km recorrido ¿Qué distancia puede recorrerse con **5 lt de diésel**?
- Opciones en Ciudad de México



Fuente: Volvo, 2016

External cost/Directive 2009/33/EC - Braunschweig

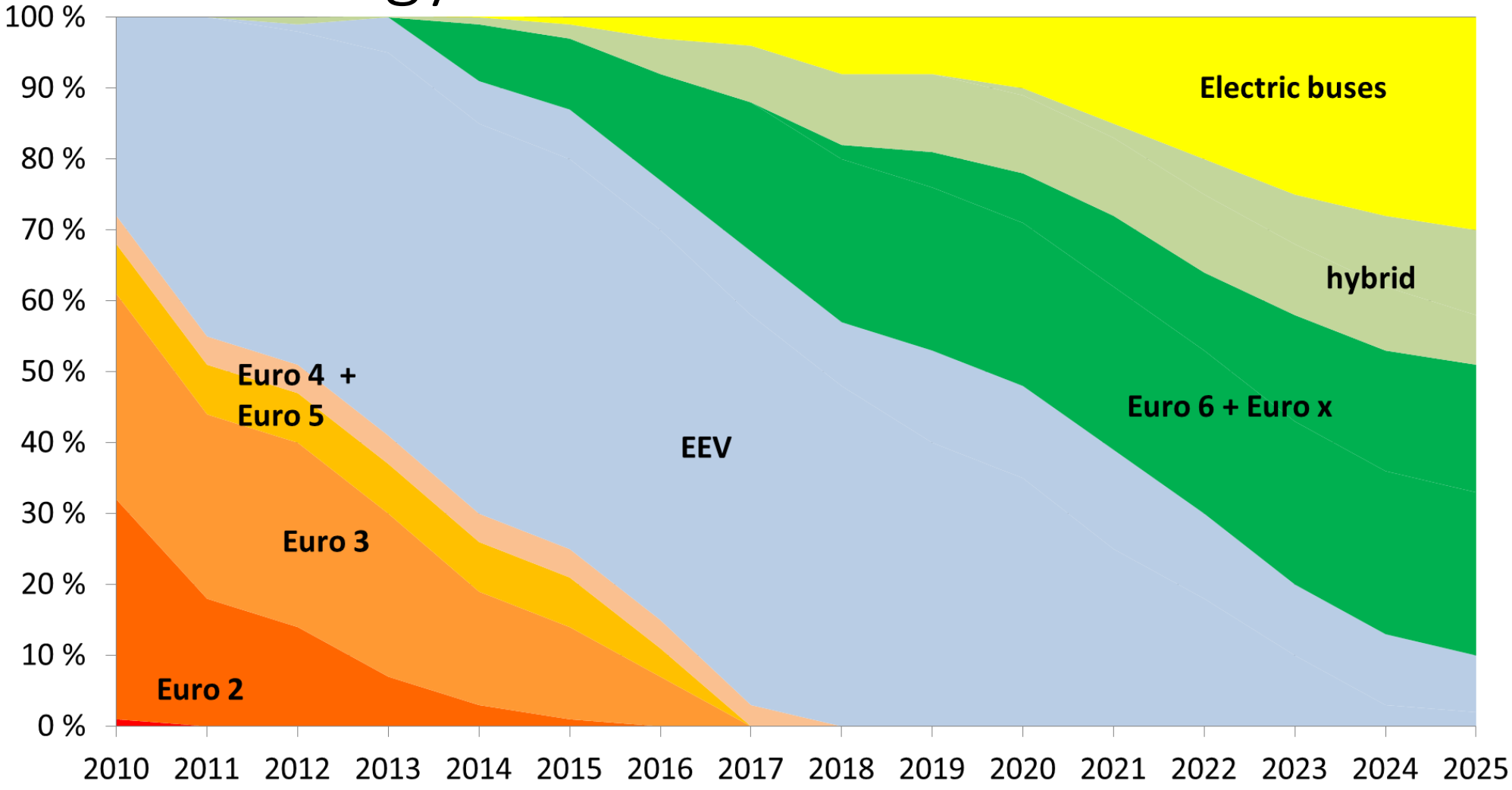


DIRECTIVE 2009/33/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 23 April 2009

on the promotion of clean and energy-efficient road transport vehicles

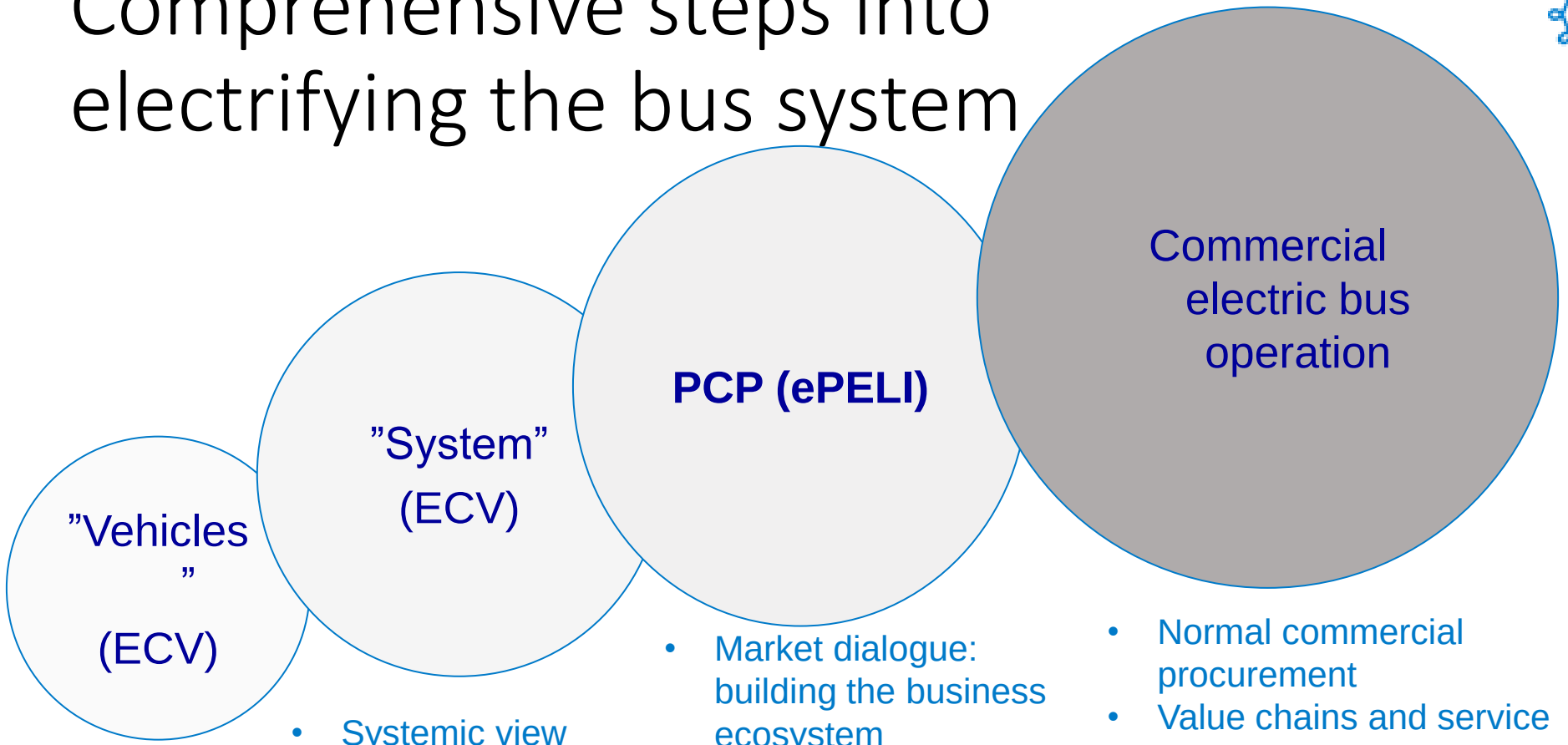
Helsinki Region Transport: Fleet strategy 2025



Estimated effect on emissions by 2025 (compared to 2010): reduction of NO_x (-92%), PM (-95%), CO_2 (-90%)

- For conventional buses, biofuels are phased in and constitute 100% from 2020 onwards

Comprehensive steps into electrifying the bus system



- Components
- Powertrain
- Single vehicles

- Systemic view
- Charging technology
- Operation concepts
- A few vehicles

- Market dialogue: building the business ecosystem
- PCP with operators
- Innovation platform
- Small fleet & charging infrastructure

- Normal commercial procurement
- Value chains and service providers established
- Several bus operators active
- Charging infrastructure available

HSL timeline: 2012 2014 2016 2016/2017? →

”ePELI” Part 1 – Innovative public procurement

- HSL, city of Helsinki, city of Espoo
- Preparing for the market-based entry of electric bus systems
  - Initiating the market dialogue: bus operators, charging systems, bus manufacturers, system suppliers, service providers
  - Supplier conferences and workshops
  - Ensuring the correct system requirements and specifications
- Creation and activation of the ecosystem
- Moving fast towards the market-driven procurement and business

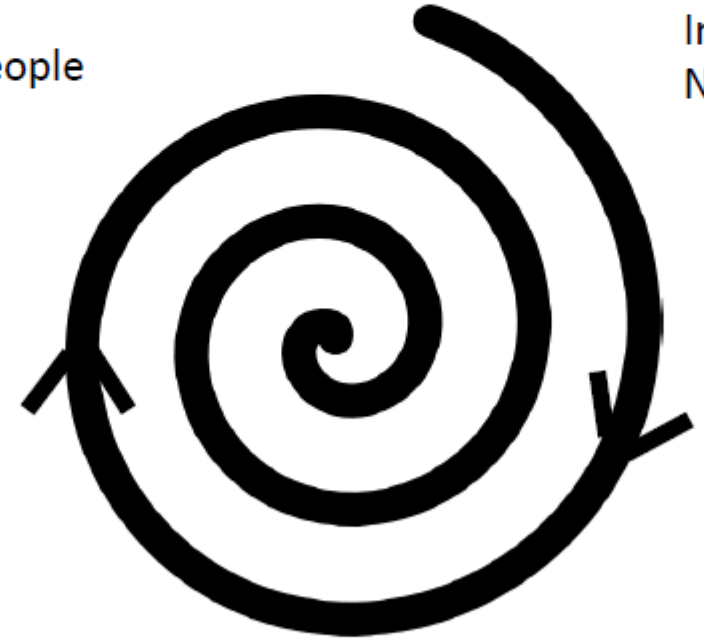

P
transdev


23 Ruskeasuo Brunakärr
55 Koskela Forsby

Latin America is relevant for global bus market

- Technologies related with Future mobility can have great benefits in public transport services, especially buses.
- Chile has the chance to be a cluster for electric bus technologies and services in Latin-American region.
- Creation of a business ecosystem can start based on HSL ePeli project adapted in medium term to condition of public transport services of a developing region.

Deterioration of public transport services – actual case in Latinamerica



More incentives to the people
To switch to private cars

Incomes of the system depens on
Number of Passenger

Less incomes produce a
services deterioration and/or
a strong pressure for more
subsidies

In growing economies people
switch form public transport
To private cars

Fuel cost increase due to
International prices and
deterioration of operational conditions
due to congestion of private cars

The income of the system
Decrease

Deterioration of public transport systems

Business ecosystem around bus technology

Atractiveness of bus services

More incentives to the people
To switch to private cars

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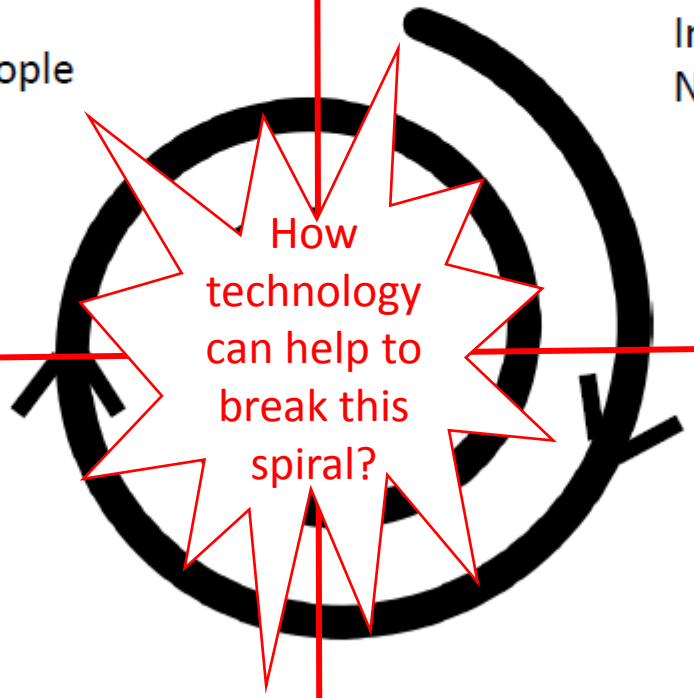
Number of Passenger



Less incomes produce a services deterioration and/or a strong pressure for more subsidies

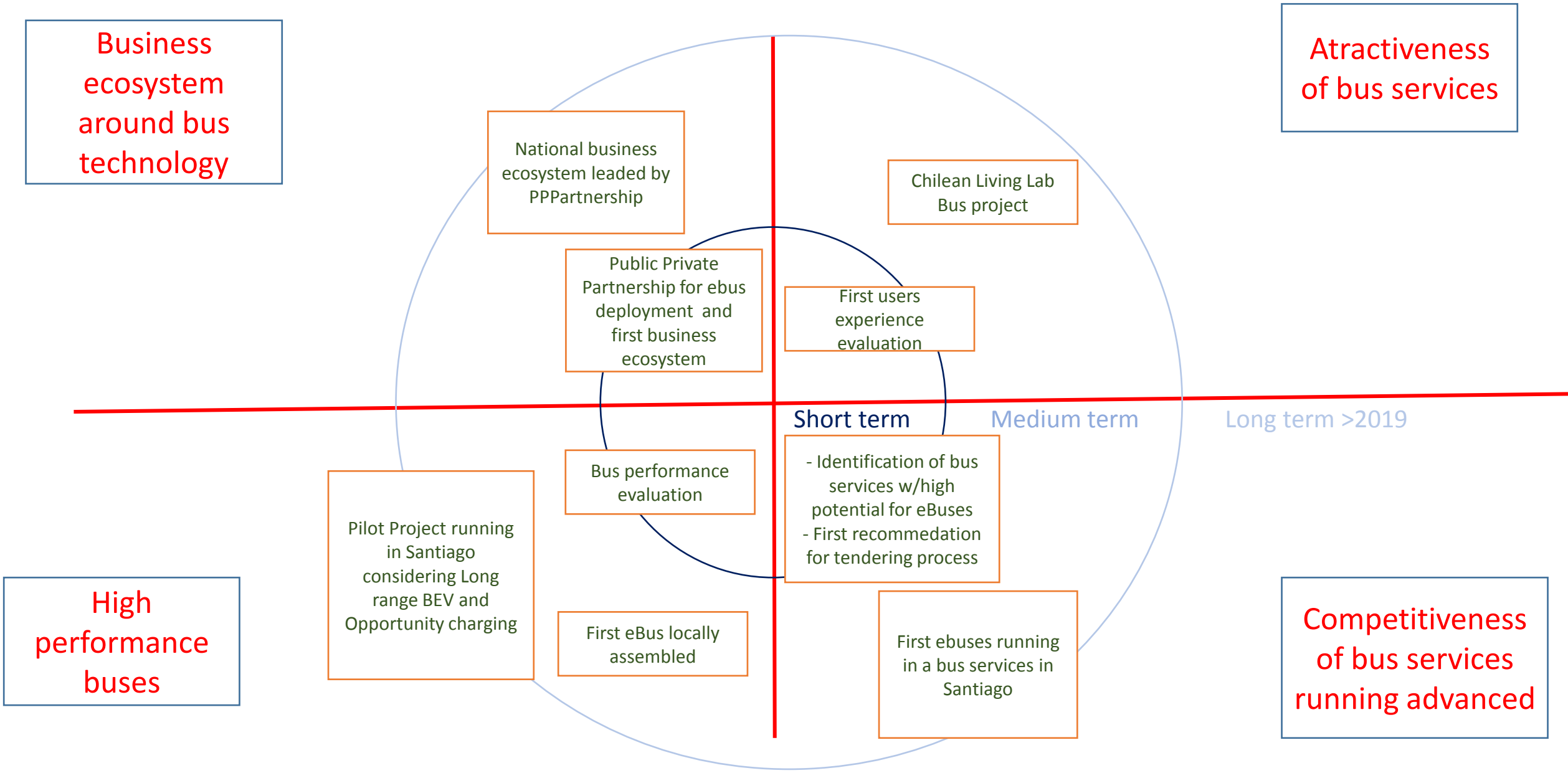
In growing economies people switch form public transport
To private cars

High performance buses

Fuel cost increase due to International prices and deterioration of operational conditions due to congestion of private cars

The income of the system
Decrease

Competitiveness of bus services running advanced technologies


Business ecosystem around bus technology
Atractiveness of bus services
National business ecosystem leaded by PPPartnership
Chilean Living Lab Bus project
Public Private Partnership for ebus deployment and first business ecosystem
First users experience evaluation
Short term
Medium term
Long term >2019
Bus performance evaluation
- Identification of bus services w/high potential for eBuses
- First recommedation for tendering process
Pilot Project running in Santiago considering Long range BEV and Opportunity charging
First eBus locally assembled
First ebuses running in a bus services in Santiago
High performance buses
Competitiveness of bus services running advanced

Public Private Partnership for ebus deployment and first business ecosystem – Bien Público para la competitividad CORFO

Consorcio Tecnológico para definir e implementar una Estrategia que permita el despliegue de la movilidad eléctrica en Transantiago y sea habilitante para el desarrollo de Aplicaciones de Ciudad Inteligente (Smart City).

Mandantes:	Ministerio de Transportes y Telecomunicaciones
	SOFOFA
Ejecutores:	ENEL Chile (Chilectra)
	Centro Mario Molina Chile
Organismo Internacionales	
Participantes:	Centro de Desarrollo Tecnológico de Finlandia (VTT)
	Autoridad de Transportes de Helsinki

Objetivos del proyecto

- Objetivo general

  Definir e implementar una estrategia que permita viabilizar la movilidad eléctrica en el transporte público

- Objetivos específicos
  - Identificar barreras y definir una estrategia para resolverlas.
  - Establecer una alianza de trabajo público privado de largo plazo que permita establecer las condiciones de mercado que permita la operación comercial de buses eléctricos.
  - Generar una plataforma de innovación en torno a la movilidad eléctrica basada en la experiencia y la cooperación de la Autoridad de Transporte de Helsinki y el VTT.

Muchas gracias

glopez@cmmolina.cl