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CIVITA ECCENTRIC in Madrid

- measures -

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MAD 2.3

Adaptive parking management based on energy efficiency and occupancy

Measure leader: Ana Rosa Llorente (Madrid City Council)

Partners

Madrid City Council

Madrid Municipal Transport Company (EMT)

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Main goals of MAD 2.3

- To reduce private car use among the targeted population, achieving a modal shift towards public transport and non-motorized modes.
- To increase car occupancy levels among the targeted population.
- At least one car park managed by a smart parking approach.
- To decrease traffic levels in the areas affected by parking management regulations.
- To reduce energy consumption and emissions from traffic.

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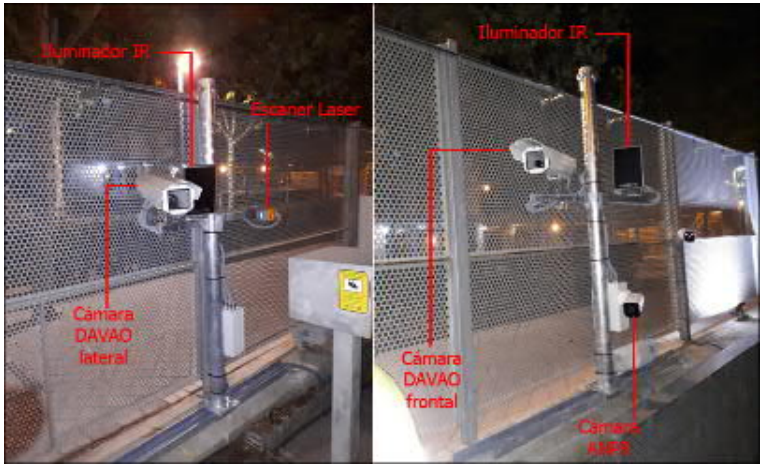
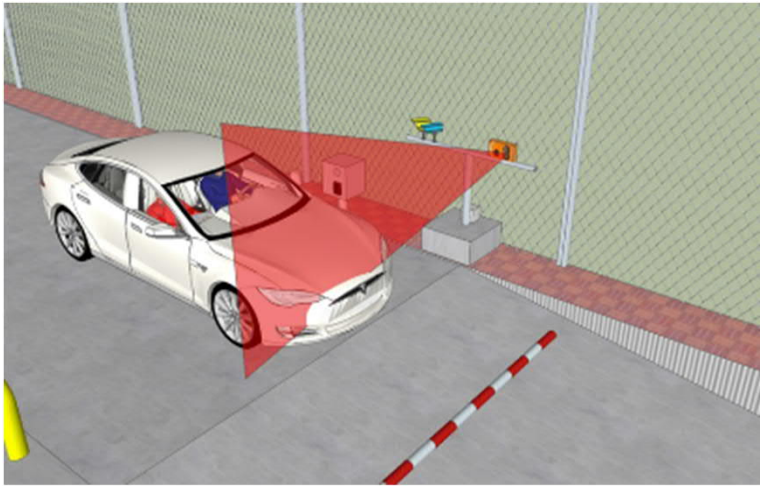
Measure outputs

- One car park managed by a smart parking approach.
- Collaboration with the main manager of public parking in Madrid (EMT).
- An innovative automatic control system (including recognition of the vehicle and the number of occupants) implemented and tested.





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Indicators

No.	Indicator	Data units	Frequency B – I (xx) – A	Method DC-E-S-C	Observed group	Area of measurement
1	Mode shift	Number of trips	A	Survey	EMT staff	EMT headquarters
2	Systems usage	%Parking places occupied at peak time	B-A	Data collection	EMT P users	EMT headquarters
3	Awareness	%	A	Survey	EMT staff	EMT headquarters
4	Acceptance	%	A	Survey	EMT staff	EMT headquarters
5	Satisfaction	Score (1-5)	A	Survey	EMT staff	EMT headquarters
6	CO2 Emissions	tons	A	Estimation	EMT staff	EMT headquarters
7	NOx Emissions	tons	A	Estimation	EMT staff	EMT headquarters
8	PM Emissions	tons	A	Estimation	EMT staff	EMT headquarters
9	Energy	MJ	A	Estimation	EMT staff	EMT headquarters
10	Capital costs	EUR	A	Data collection	EMT staff	EMT headquarters
11	Operating costs	EUR	A	Data collection	EMT staff	EMT headquarters
Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period						

Indicators results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Difference After-Before	Net impact After–BaU
Mode shift	trips	0	2/2018	0	3/2019	110	3/2019	110	**110**
Systems usage	%	83.5%	9/2018	83.5%	9/2019	70.3%	9/2019	-13.2	**-13.2**
Awareness	%	-	-	-	3/2019	72.0%	3/2019	-	**-**
Acceptance	%	-	-	-	3/2019	48.0%	3/2019	-	**-**
Satisfaction	Score	3.3	2/2018	3.3	3/2019	2.6	3/2019	-0.7	**-0.7**
CO2	tons	61146	2/2018	61146	3/2019	61136	3/2019	-0.015%	**-0.015%**
NOx	tons	156.74	2/2018	156.74	3/2019	155.98	3/2019	-0.484%	**-0.484%**
PM	tons	10.5	2/2018	10.5	3/2019	10.4	3/2019	-0.293%	**-0.293%**
Energy	MJ	827.42	2/2018	827.42	3/2019	827.39	3/2019	-0.003%	**-0.003%**
Capital cost	EUR	0	-	0	2019	39806	2019	39806	**39806**
Operating cost	**EUR**	**0**	**2019**		**2019**	**15000**	**2019**	**15000**	**15000**

Main results

The measure has been effective in achieving modal shift: 8.2% of the EMT staff members have changed their transport mode between 2018 and 2019, resulting in an increase in the modal share of public transport and car-pooling.
45% mentioned the ECCENTRIC measure (changes in the assignment of parking places) as the reason to the modal change.

The reduction in car travel, measured in the access to the EMT headquarters has been substantial, as measured by the occupancy of the parking facility: 13.2 percentage points.

There was an increase in car occupancy in the cars accessing the parking lot from 1.12 in December 2018 to 1.18 in October 2019. There was also an increase in the modal share of car-pooling from 4.2% to 8.3%.

Modal shift has not resulted in significant reductions in emissions or energy consumption. EMT workers changing to a more sustainable mode have largely been short-distance trips, whereas changes in the opposite direction (towards individual car use) have occurred in long-distance trips.

The level of awareness was high (72% of the EMT staff members declared to have a medium-to-detailed knowledge of the ECCENTRIC measure). However, the level of acceptance and satisfaction was not high (2.3 and 2.6 over 5, respectively), reflecting the resistance that demand management measures usually face within companies.

The influence of the measure on vehicles' characteristics has not been demonstrated: plug-in hybrid and electric cars remain marginal within the staff's cars.

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Objective and target

No.	Objective and target	Rating	Comment
1	6% reduction of car travel in the affected area	Exceeded	**The affected area is reduced to the EMT headquarters access**
2	Reduction of parking offence levels in the affected area	Not Achieved	**Objective not relevant in the new demonstration site**
3	Increase of car occupancy in the affected area	Achieved in full	

Lessons learned

- Parking management measures are effective in encouraging modal change; this includes changes in the criteria to grant access to parking facilities in a company's premises. In particular, car-pooling can be promoted through parking management measures.
- A priority parking access measure in itself does not provide an incentive strong enough to change users' car choice: the staff is not likely to change their car purchase decisions at the light of the new parking access policy.
- The environmental impacts (emissions and energy consumption) of car-pooling are likely to be modest compared to the resources required to support car-pooling, as modal change is more likely to happen in shorter than in longer trips (probably due to the difficulties to find a trip partner and the more rigid conditions (e.g. timing) associated to long trips).
- Automated control of car occupancy remains a technical challenge, that cannot provide fully-satisfactory control of parking access.

Upscaling in Madrid

- The potential to up-scale this measure at the city level is low. Although car-pooling could be encouraged through it, the project has shown that the environmental benefits of such trend is uncertain, as at least some carpoolers can be former public transport or non-motorised users. Furthermore, car-poolers tend to travel short-distance trips, as long-distance commuters are less likely to find a suitable ride partner; this reduces the environmental impact of the modal change achieved.
- Lack of technical reliability is another reason preventing upscaling. The automated system has not provided a sound evidence about its ability to effectively control the number of car occupants. This prevent this technology to be expanded in the network of EMT public parking facilities in Madrid.

MAD 2.8

Mobility management strategies for vulnerable groups

Measure leader: Pilar Martín (Madrid City Council)

Partners

Madrid City Council

Grupo de Estudios y Alternativas (GEA21) |

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Objetivos de la medida 2.8

Con esta medida, el Municipio de Madrid pretende reforzar el proceso de planificación del PMUS (Plan de Movilidad Urbana Sostenible) mediante el desarrollo de un proceso participativo dirigido a grupos vulnerables, complementado con un enfoque de género.

Los objetivos también incluyen mejoras puntuales de la seguridad vial y de la calidad del espacio público en áreas frecuentadas por personas mayores y niños.

- **Perspectiva social: Directrices para abordar la gestión de la movilidad de los grupos vulnerables con un enfoque de género;**
- **Cambio de comportamiento: aumento de la independencia, empoderamiento y una mayor percepción de seguridad por parte de los grupos vulnerables;**
- **Ahorro energético: Apoyo a los modos activos de desplazamiento;**
- **Medio Ambiente: Ahorro de emisiones como resultado del cambio modal;**
- **Gobernanza: Procesos inclusivos y participativos.**

Principales realizaciones

- **Remodelación de la plaza de la Constitución;**
- **Fundación del club ‘Anda con nosotros’;**
- **Instalación de pantallas con el tiempo de espera de las líneas de autobuses de la EMT dentro del recinto del Centro Social de Mayores;**
- **Realización de vídeos dentro de la campaña de fomento de buenas prácticas para una movilidad activa, independiente, sostenible e inclusiva de los mayores;**
- **Difusión de campañas de comunicación;**
- **Talleres y cursos en escuelas (fotografía, ciclismo, movilidad y urbanismo, cambio climático, técnicas de comunicación, etc.)**
- **Organización de bicicletadas y pedibuses;**
- **Participación de las personas mayores en la organización de los eventos anuales de movilidad (EMW, Día Internacional contra el Cambio Climático, etc).**

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Indicadores

No.	INDICADOR	UNIDAD	FRECUENCIA	METODO	ÁREA
1	Cambio modal (mayores)	Viajes/%	Antes / Después*	Encuesta	City lab
2	Cambio modal (niños)	Viajes/%	Antes / Después*	Encuesta	City lab
3	Conocimiento (mayores)	%	Antes / Después*	Encuesta	City lab
4	Conocimiento (niños)	%	Antes / Después*	Encuesta	City lab
5	Aceptación (mayores)	%	Antes / Después*	Encuesta	City lab
6	Aceptación (niños)	%	Antes / Después*	Encuesta	City lab
7	Satisfacción (mayores)	Puntuación (1-5)	Antes / Después*	Encuesta	City lab
8	Satisfacción (niños)	Puntuación (1-5)	Antes / Después*	Encuesta	City lab
9	Emisiones de CO2 (mayores)	Toneladas/Año	Antes / Después*	Estimación	City lab
10	Emisiones de NOx (mayores)	Toneladas/Año	Antes / Después*	Estimación	City lab
11	Emisiones de PM (mayores)	Toneladas/Año	Antes / Después*	Estimación	City lab
12	Emisiones de CO2 (niños)	Toneladas/Año	Antes / Después*	Estimación	City lab
13	Emisiones de NOx (niños)	Toneladas/Año	Antes / Después*	Estimación	City lab
14	Emisiones de PM (niños)	Toneladas/Año	Antes / Después*	Estimación	City lab
15	Percepción de seguridad subjetiva (mayores)	Puntuación (1-5)	Antes / Después*	Encuesta	City lab

* After: at the end of the CIVITAS operation period

Valores indicadores

Indicador	Unidad	Antes	Fecha Antes	BaU	Fecha BaU	Después	Fecha después	Diferencia Después - Antes	Diferencia Después - BaU
Cambio modal - modos sostenibles (mayores)	%	93.8%	2017	93.8%		93.8%	2019	0.0%	**0.0%**
Cambio modal – modo a pie (mayores)	%	66.7%	2017	66.7%		75.3%	2019	8.5%	**8.5%**
Cambio modal - modos sostenibles (niños)	%	75.3%	2016	75.3%		78.7%	2019	3.4%	**3.4%**
Conocimiento (mayores)	Puntuación (1-5)	NA		NA		1.9	2019	NA	**NA**
Conocimiento (niños)	Puntuación (1-5)	NA		NA		5.0		NA	**NA**
Aceptación (mayores)	Puntuación (1-5)	NA		NA		5.0	2019	NA	**NA**
Aceptación (niños)	Puntuación (1-5)	NA		NA		5.0		NA	**NA**
Satisfacción (mayores)	Puntuación (1-5)	NA		NA		4.9	2019	NA	**NA**
Satisfacción (niños)	Puntuación (1-5)	NA		NA		4.8	2019	NA	**NA**
Emisiones CO2 (mayores)	Toneladas/ Año	1248	2017	1508	2019	968	2019	-280	**-540**
Emisiones NOx (mayores)	Toneladas/ Año	1.78	2017	2.16	2019	1.39	2019	-0.39	**-0.77**
Emisiones PM (mayores)	Toneladas/ Año	0.1148	2017	0.1386	2019	0.0890	2019	-0.0258	**0.0497**
Emisiones CO2 (niños)	Toneladas/ Año	66.15	2016	66.15	2019	42.20	2019	-24.0	**-24.0**
Emisiones NOx (niños)	Toneladas/ Año	0.1310	2016	0.1310	2019	0.0801	2019	-0.0509	**-0.0509**
Emisiones PM (niños)	Toneladas/ Año	0.0062	2016	0.0062	2019	0.0040	2019	-0.0023	**-0.0023**
Percepción de seguridad subjetiva (mayores)	Puntuación (1-5)	**3**	**2017**	**3**	**2019**	**3.9**	**2019**	**0.9**	**0.9**

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Principales resultados

- **Aumento del 8,5% de viajes a pie entre los mayores, reemplazando viajes en transporte público;**
- **Aumento del 3,4% de viajes en modo sostenibles entre los niños, reemplazando viajes en coche.**

- **En términos de aceptación, el 100% de los entrevistados expresaron su total apoyo a las acciones llevadas a cabo (5/5);**
- **En términos de satisfacción, las notas atribuidas han sido muy altas en los dos grupos (4,9/5 entre los mayores y 4,8/5 entre los niños).**

- **Reducción del 36% de las emisiones anuales de CO2, NOx y MP entre los mayores;**
- **Entre los niños, reducción del 36% de las emisiones anuales de CO2 y MP, y del 39% de las emisiones anuales de NOx.**

- **Participación y visibilidad: 45 eventos han sido organizados hasta agosto de 2019, movilizando en torno a 700 personas;**

- **La percepción de la seguridad vial por parte de los mayores pasó de 3 a 3,9 en una escala de 1 a 5, lo que supone un aumento del 30% entre 2017 y 2019.**

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Objetivos y Metas

No.	OBJETIVOS Y METAS	Clasificación
1	Más participación: por lo menos 40 personas involucradas en las campañas	Excedido
2a	Disminución de los viajes en coche en 5-6 puntos porcentuales para los viajes de los niños	No se ha alcanzado*
2b	Disminución de los viajes en coche en 4 puntos para los viajes de los mayores	Alcanzado sustancialmente (al menos el 50%) **
3	Aumento de la percepción de seguridad vial de los mayores en un 15%	Excedido
4	Mayor visibilidad: 12 eventos organizados a lo largo del proyecto con grupos vulnerables	Excedido
5a	Reducción de CO2 y otras emisiones (niños)	No se ha alcanzado ***
5b	Reducción de CO2 y otras emisiones (mayores)	Excedido

* En el caso de los niños, la proporción de modos de transporte sostenibles aumentó de un 72,7% ya elevado a un 74,3% o 1,6 puntos porcentuales, por debajo del objetivo de 5 puntos.

** En el caso de los mayores, la proporción inicial extremadamente baja de uso de automóviles (sólo el 6,2%) dificultó la obtención de nuevas reducciones. Sin embargo, las actividades del proyecto parecen haber tenido un efecto positivo en los desplazamientos a pie, que aumentaron en 8,5 puntos porcentuales, debido principalmente a los viajes que antes se hacían en transporte público.

*** Los resultados de la división modal se traducen en diferentes reducciones de las emisiones para los dos grupos objetivo. Las reducciones han sido sustanciales en el caso de los mayores, y a cambios pequeños en el caso de los niños.

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Lecciones aprendidas

- **El proyecto demostró el impacto limitado de las actividades aisladas, y la necesidad de comprometerse con estos grupos en procesos a largo plazo. Parece razonable establecer programas con personal y recursos propios, e incorporar estas actividades en el día a día de las escuelas y de los centros de mayores.**
- **Las dificultades que hay que afrontar para incluir las acciones en los presupuestos municipales precisan el establecimiento de procedimientos burocráticos internos, que permiten una respuesta más flexible y adaptada a las propuestas que provienen de la participación social.**
- **Aunque de forma limitada, el cambio modal para los niños es posible. Cabe destacar que la mayor parte del cambio modal que proviene del uso del automóvil deriva hacia el transporte público en vez de fomentar el modo a pie.**
- **La promoción del ciclismo entre los niños (y, sobre todo, entre los mayores) es una batalla a largo plazo. Probablemente, esto se debe a la todavía escasa presencia ciclista en Madrid.**
- **Las medidas destinadas a fomentar el cambio modal entre estos grupos sociales necesitan un entorno y un marco normativo favorables. En este sentido, deben encauzarse dentro de políticas firmes que apoyen la movilidad sostenible a nivel de la ciudad.**
- **La planificación urbana tiene una gran influencia en las condiciones de movilidad, en particular en el caso de los niños. La escuela que presentó menores resultados en cuanto al cambio modal (Loyola de Palacio) estaba situada en una zona de reciente desarrollo, con un diseño muy orientado al automóvil. Las medidas implantadas en esos barrios difícilmente serán eficaces si no se adoptan estrategias más amplias para rediseñar el espacio urbano.**

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MAD 3.3

Open platform for multimodal mobility information and services

Measure leader: Nuria Blanco (Madrid Regional Transport Consortium)

Partners

Madrid Municipal Transport Company (EMT) | Madrid Regional Transport Consortium (CRTM) | Ingeniería y Consultoría para el Control Automático (ICCA)

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Main goals of MAD 3.3

- To increase the quantity and quality of information given to users in order to improve the users' experience.
- To promote economic activity through entrepreneurs who will generate added value to the information gathered on the platform.
- To create cooperation between different actors (public and private) involved in mobility issues.
- To establish the basis for the subsequent development of Mobility as a Service (MaaS) services for citizens.
- To increase the model split from private to public transport.

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Measure outputs

- Integrated Open Data mobility platform, gathering and providing information from all transport modes.
- Consolidated database of public transport services in real time with information of suburban buses (information of around 30 private companies operating 36 concessions).
- Support the development or improvement of more than 18 mobile apps and 9 websites providing information on the mobility system in Madrid.

Indicators

No	Indicator	Data units	Frequency B – I (xx) – A	Method DC-E-S-C	Observed group	Area of measurement
	System usage	Users/month	A	Data collection	Developers	Region
	System usage	Users/month	A	Data collection	Public	Living lab and region
	Satisfaction	Score (1-5)	A	Survey	Developers	Region
	Satisfaction	Score (1-5)	A	Survey	Public	Region
	Number of data sources	Quantity	A	Data collection	Data owners	Region

Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period

Indicators results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Diffe-rence After-Before	Net impact After–BaU
System usage (developers)	Users/yr	6638	2017	6638	2019	6923	2019	285	**285**
System usage (users)	Users/yr	278790	2017	278790	2019	252770	2019	-26020	**-26020**
Satisfaction (developers)	Score (1-5)	NA	2017	NA	2019	3.9	2019	NA	**NA**
Satisfaction (users)	Score (1-5)	3	2017	3	2019	3.8	2019	0.8	**0.8**
Number of data sources	**Quantity**	**1**	**2017**	**1**	**2019**	**1**	**2019**	**0**	**0**

Main results

The increase in the number of queries to the new open data portal (with substantial improvement in terms of real-time information) compared to the old one has increased by 11% in a little more than 2 years.

ECCENTRIC has been successful in mobilising the developers' community and in supporting the development or improvement of more than 18 mobile apps and 9 websites providing information on the mobility system in Madrid.

The quality of the information has been positively assessed by public transport users, with an average score of 3.8, and by a small sample of app developers, with an average score of 3.9.
Websites and apps are being used to estimate waiting times ("always" by 46.9% "and sometimes" by 18.3% of respondents, respectively), for trip planning ("always" by 32.9% "and sometimes" by 29.7% of respondents, respectively), and for on-route verification ("always" by 15.4% "and sometimes" by 19.1% of respondents, respectively).

Objective and target

No.	Objective and target	Rating	Comment
1	Number of data sources integrated in the platform (static and dynamic, by provider)	Not Achieved	ECCENTRIC was unsuccessful in cooperating with mobility service providers outside the traditional PT system, due to commercial concerns.
2	Increase in the number of queries (visits) to the CRTM information sites.	Not Achieved	The number of queries to the CRTM information sites (app Mi Transporte and web site) slightly decreased, as new apps entered the market providing services better tailored to different users' profiles.
3	Number of queries to the open data portal from its implementation to the end of the project	Achieved in full	The number of queries significantly increased, reflecting the value of open data for the developers' community.
4	Number of open data licenses signed and new mobile applications developed with data from the portal.	Substantially achieved (at least 50%)	Developers were not requested to sign licenses to use PT open data. The high number of apps available in Madrid suggest that a substantial number of them were developed or improved as a result of ECCENTRIC.
5	Increase the quality perceived by clients related to public transport information systems (surveys to users)	Achieved in full	The survey provided evidence of a high level of satisfaction among apps' users.

Lessons learned

- Open data platforms can be an excellent tool for app developers to get interested in urban mobility and develop innovative applications providing real-time information for users.
- Users appreciate the availability of a variety of mobility apps, as they can look for those better tailored to their particular expectations.
- Users are primarily interested in getting information on waiting times, trip planning and to a lesser extent, on-route confirmation of the itinerary.
- New mobility operators, providing services outside the traditional transport system such as car or bike sharing and micromobility are reluctant to share their information in such platforms. Efforts to do so are likely to require early involvement of these stakeholders and an adequate framework to gain their trust.

Upscaling in Madrid

- As the platform is already covering the whole region, there are no further plans for geographical up-scaling. The platform will remain operation after the termination of ECCENTRIC and CRTM will keep trying to attract additional mobility providers to join it, once their market position strengthens and they may become less concerned about losing commercial independence and consider the advantages of getting their services known by a much broader community of potential users.

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MAD 4.1

Innovative and participative approach to traffic safety

Measure leader: Luis Fernández Heredia (Madrid City Council)

Partners

Madrid City Council

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Expected impacts

This measure is expected to have impacts on safety and perception of safety. Action is expected to be better targeted on the most conflictual road sections (objective safety perception) and also on those sections perceived as riskier by users (subjective safety perception).

Long term objectives

- **Promote non-motorized mobility by providing a safer and more comfortable environment**

Short term objectives

- **Reducing the number of fatal accidents and serious injuries**
- **Reducing the perceived accident risk by all means of transport (particularly non-motorized).**

Measure outputs

- **Identification of relevant indicators and development of guidelines and procedures for urban traffic safety analysis.**
- **Setting up a GIS platform on urban traffic safety with business-intelligence and data-mining tools for analysis, initially covering the two districts in the living lab and subsequently expanded to the whole municipality of Madrid.**
- **Identification of existing communication and participation channels for citizens' involvement in traffic safety issues (from official participatory channels to social media), and development of adequate tools to analyse these contributions.**

Indicators

No.	INDICATOR	DATA UNITS	FREQUENCY B – I (XX) – A	METHOD	OBSERVED GROUP	ÁREA
1	Number of fatalities and seriously injured	persons/year	B; I(annual); A	Data collection	All transport users	Demonstration area
	Number of incidents reported by citizens	Incidents/month	A	Data collection	All transport users	Demonstration area
2	Satisfaction	Score (1-5)	A	Survey	Users contributing to the GIS platform	Demonstration area
	Governance/ Pilot progress	Units	A	Data collection	Technicians and decision makers at the municipality	Demonstration area
Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period						

Measure results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Diffe-rence After-Before	Net impact After–BaU
Number of fatalities and seriously injured	persons/year	1170	2017	1170	2019	972	2018	-198	**-198**
Number of incidents reported by citizens	Incidents/month	0	2017	0	2019	14.6	2019	14.6	**14.6**
Satisfaction	Score (1-5)	2.8	2017	2.8	2019	2.2	2019	-0.5	**-0.5**
New safety actions	**Units**	**0**	**2017**	**0**	**2019**	**300**	**2019**	**300**	**300**

Measure results

- **The municipality has reported to have undertaken 70 studies and 300 proposals during the demonstration period, in which the new tool has been used.**

- **The number of fatalities and seriously injured decreased in the two districts between 2017 and 2018, by 16.9%*, whereas at the city level it decreased by 6.5%.**

- **The municipality staff responsible for safety actions are empowered with more accurate information, including the citizens' and residents' perspectives.**

However, it is uncertain that this decrease can be attributed to ECCENTRIC, as the implementation of the measure was not completed until November 2018; it will be necessary to wait until 2019 data becomes available to assess this impact.

Achievement of objectives

No.	OBJECTIVE AND TARGET	RATING
1	Reducing the number of accidents and seriously injured*	**Substantially achieved (at least 50%)**
2	Improved perceived safety levels (perceived accident risk, particularly for non-motorised users)**	**Substantially achieved (at least 50%)**

* 1181 accidents in the living lab in 2018 compared to 1051 in 2017, with 972 compared to 1170 seriously injured or death.

** Score of comments increased from 2.0 (from 7 comments) in December 2018 to 2.4 (from 11 comments) in September 2019 for the whole city

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Lessons learned

- **Although relatively resource-intensive to integrate accident data reports, the development of a GIS-based tool has proved effective in facilitating the analysis of accident statistics in the city and to support the technical practice of the municipal services: The municipality has reported to have undertaken 70 studies and 300 proposals during the demonstration period, in which the new tool has been used.**
- **Monitoring the impact of accident-related measures is difficult, as the number of casualties and accidents can be influenced by many other variables and policy actions.**
- **The potential contribution of social media message analysis to accident monitoring and assessment is limited, due to the low number of messages related to accidents that can be identified, and the inability to identify the parts of the city or the transport mode they referred to. Direct engagement with the public and improved participatory channels remain necessary to effectively integrate the views and knowledge of the public in road safety policies in cities.**

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MAD 4.1

Innovative and participative approach to traffic safety

Measure leader: Luis Fernández Heredia (Madrid City Council)

Partners

Madrid City Council

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Expected impacts

This measure is expected to have impacts on safety and perception of safety. Action is expected to be better targeted on the most conflictual road sections (objective safety perception) and also on those sections perceived as riskier by users (subjective safety perception).

Long term objectives

- **Promote non-motorized mobility by providing a safer and more comfortable environment**

Short term objectives

- **Reducing the number of fatal accidents and serious injuries**
- **Reducing the perceived accident risk by all means of transport (particularly non-motorized).**

Measure outputs

- **Identification of relevant indicators and development of guidelines and procedures for urban traffic safety analysis.**
- **Setting up a GIS platform on urban traffic safety with business-intelligence and data-mining tools for analysis, initially covering the two districts in the living lab and subsequently expanded to the whole municipality of Madrid.**
- **Identification of existing communication and participation channels for citizens' involvement in traffic safety issues (from official participatory channels to social media), and development of adequate tools to analyse these contributions.**

Indicators

No.	INDICATOR	DATA UNITS	FREQUENCY B – I (XX) – A	METHOD	OBSERVED GROUP	ÁREA
1	Number of fatalities and seriously injured	persons/year	B; I(annual); A	Data collection	All transport users	Demonstration area
	Number of incidents reported by citizens	Incidents/month	A	Data collection	All transport users	Demonstration area
2	Satisfaction	Score (1-5)	A	Survey	Users contributing to the GIS platform	Demonstration area
	Governance/ Pilot progress	Units	A	Data collection	Technicians and decision makers at the municipality	Demonstration area
Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period						

Measure results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Diffe-rence After-Before	Net impact After–BaU
Number of fatalities and seriously injured	persons/year	1170	2017	1170	2019	972	2018	-198	**-198**
Number of incidents reported by citizens	Incidents/month	0	2017	0	2019	14.6	2019	14.6	**14.6**
Satisfaction	Score (1-5)	2.8	2017	2.8	2019	2.2	2019	-0.5	**-0.5**
New safety actions	**Units**	**0**	**2017**	**0**	**2019**	**300**	**2019**	**300**	**300**

Measure results

- **The municipality has reported to have undertaken 70 studies and 300 proposals during the demonstration period, in which the new tool has been used.**

- **The number of fatalities and seriously injured decreased in the two districts between 2017 and 2018, by 16.9%*, whereas at the city level it decreased by 6.5%.**

- **The municipality staff responsible for safety actions are empowered with more accurate information, including the citizens' and residents' perspectives.**

However, it is uncertain that this decrease can be attributed to ECCENTRIC, as the implementation of the measure was not completed until November 2018; it will be necessary to wait until 2019 data becomes available to assess this impact.

Achievement of objectives

No.	OBJECTIVE AND TARGET	RATING
1	Reducing the number of accidents and seriously injured*	**Substantially achieved (at least 50%)**
2	Improved perceived safety levels (perceived accident risk, particularly for non-motorised users)**	**Substantially achieved (at least 50%)**

* 1181 accidents in the living lab in 2018 compared to 1051 in 2017, with 972 compared to 1170 seriously injured or death.

** Score of comments increased from 2.0 (from 7 comments) in December 2018 to 2.4 (from 11 comments) in September 2019 for the whole city

Lessons learned

- **Although relatively resource-intensive to integrate accident data reports, the development of a GIS-based tool has proved effective in facilitating the analysis of accident statistics in the city and to support the technical practice of the municipal services: The municipality has reported to have undertaken 70 studies and 300 proposals during the demonstration period, in which the new tool has been used.**
- **Monitoring the impact of accident-related measures is difficult, as the number of casualties and accidents can be influenced by many other variables and policy actions.**
- **The potential contribution of social media message analysis to accident monitoring and assessment is limited, due to the low number of messages related to accidents that can be identified, and the inability to identify the parts of the city or the transport mode they referred to. Direct engagement with the public and improved participatory channels remain necessary to effectively integrate the views and knowledge of the public in road safety policies in cities.**

MAD 4.7

Enabling cycling outside the city centre

Measure leader: Marisol Santos (Madrid City Council)

Partners

Madrid City Council | Grupo de Estudios y Alternativas (GEA21) |
Madrid Regional Transport Consortium (CRTM)

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Main goals of MAD 4.7

- To decarbonize mobility in the city of Madrid.
- To improve health and air quality, avoiding unnecessary car trips.
- To shift the urban mobility patterns in the outskirts of the city towards active and sustainable modes.
- To address the residents' short-distance mobility demands.
- To increase cycling levels.
- To achieve a modal share of 2% for bicycle trips in Madrid.
- To reduce haphazard traffic with cyclists involved.

Measure outputs

Besides providing a vision for a future district-wide cycling network, the measure designed and implemented shared lanes for bikes and general traffic along key north-south and east-west sections within the living lab.

- Shared lanes were created on the following streets: Calle Martínez de la Riva, Calle Monte Igueldo, Calle Puerto Canfranc, Calle Sierra Toledana, Calle El Bosco, Av. Rafael Alberti and Avenida de la Albufera.
- A bike lane followed by a shared lane was implemented on Calle del Convenio.
- A cycle lane providing north-south connectivity was created through the Itinerario Miradores project.
- Improvement works of the section of the “Bike Green Ring” in the area.

Indicators

No.	Indicator	Data units	Frequency B – I – A	Method DC-E-S-C	Observed group	Area of measurement
	Modal shift (number of trips changing mode to cycling, classified by previous mode)	Quantity (trips)	A	Survey	Cyclists using the new designed area	Transport system
	System usage: cyclists flow	Cyclists/m2	A	Survey	Id.	Transport system
	Number of accidents involving bikes in the area	Quantity/month	A	Data Collection	Id.	Transport system
	Satisfaction of cyclists in the area with the new design	Score (1-5)	A	Survey	Id.	Society
	CO2 emissions avoided due to modal change	Tons/year	A	Estimation	Id.	Environment
	NOx emissions avoided due to modal change	Tons/year	A	Estimation	Id.	Environment
	PM emissions avoided due to modal change	Tons/year	A	Estimation	Id.	Environment
Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period						

Indicators results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Difference After-Before	Net impact After–BaU
Modal shift	Trips/ month	0	2016	0	2019	25,459	2019	25,459	**25,459**
System usage: Cyclist flow, peak hour Albufera	Cyclists/hour	16	2017	16	2019	NA	2020	NA	**NA**
Accidents including bikes	Acc./ year	57	2016	57	2019	55	2019	- 2	**- 2**
Satisfaction of cyclists in the area with the new design	Score (1-5)	3	2016	3	2019	2.8	2019	-0.2	**-0.2**
CO2 emissions avoided due to modal change	Tons/ year	0	2016	0	2019	35.2	2019	35.2	**35.2**
NOx emissions avoided due to modal change	Tons/ year	0	2016	0	2019	0.1343	2019	0.1343	**0.1343**
PM emissions avoided due to modal change	**Tons/ year**	**0**	**2016**	**0**	**2019**	**0.0038**	**2019**	**0.0038**	**0.0038**

Main results

- 849 new cycling trips per day coming from other modes of transport.

- The number of traffic accidents involving cyclists has slightly decreased (by 3.5%)

- Reduction of 35.2 tons/year of CO2 and other emissions (36.6% reduction due to change from public transport; 63.4% from private car).

- The perception of the street conditions (which include safety as a key trait) has improved for 16% of the people who answered the survey to cyclists.
- 16% of the respondents were influenced by the street improvements on their choice for cycling.

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Objective and target

No.	Objective and target	Rating	Comment
1	1000 new bike trips per day (i.e. 2% bike modal share)	Substantially achieved	**849 cycling trips per day coming from other modes**
2	No increase in traffic accidents involving cyclists	Exceeded	**Proxy: impact of perception of street conditions on modal choice**
3	50 t/year of savings in CO_{2eq} emissions	Substantially achieved	**36.6% reduction due to change from public transport; 63.4% from private car**

Drivers and barriers

Main barriers:

- Financial: restrictions to the use of municipal budget in infrastructure improvements forced the search for cheaper alternatives such as the shared lanes;
- Institutional: insufficient support from local policy makers;
- Planning: failures in the design and execution of the measure. Learning from mistakes, the project measure team was able to adapt alternative actions finally implemented.

Main drivers:

- Positional: support to biking already stated in the municipality's strategies and mobility plans;
- Institutional: favourable legal and institutional framework, besides a strong support of political decision makers in Vallecas Districts and within the Mobility Area;
- Organisational: experience and knowledge of the municipal structures and decision-making processes by the measure leaders. Adequate leadership and effective involvement of all relevant stakeholders.

Lessons learned

- It is difficult to introduce participatory approaches in research and demonstration projects with tight schedules. Demonstration projects may need to establish formalised participation plans at the beginning of the measure design, identifying the local stakeholders and the participation and decision-making procedures.
- Cycling actions need to be identified and implemented within duly formalised network concepts at the city and district levels.
- Only a small fraction of the cycling trips replaces car trips. To curb car use, cities should combine actions oriented to promote sustainable modes with car restrictions.
- Cycling-friendly measures provide modest CO2 emission savings, In the absence of car restrictions, these actions are unlikely to provide significant emission savings.

Upscaling in Madrid

The municipality has not developed specific up-scaling actions concerning this measure.

However, the current revision of the Sustainable Urban Mobility Plan and cyclist network, supposes updating and expanding the Cycling Master Plan, including cyclist networks at the district level.

This could provide an excellent framework for up-scaling the cycling concepts developed by ECCENTRIC in the living lab.

MAD 5.1

High level PT service corridors in peripheral districts

Measure leader: Laura Delgado | Alicia Velasco (CRTM)

Partners

Madrid Regional Transport Consortium (CRTM)

Madrid Municipal Transport Company (EMT)

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Main goals of MAD 5.1

The main goal of the measure was to contribute to expand the bus network in peripheral districts and increase modal share for public transport (PT).

To do so, the measure would implement a pilot construction project covering a 3.6-km section connecting the living lab with the districts of Moratalaz, San Blas-Canillejas and Ciudad Lineal, in the northeast periphery.

The measure was expected to increase bus patronage in the pilot section as a result of a gain in commercial speed (10%, reaching over 13 km/h), and regularity levels (by 9%, reaching an average level of 94%).

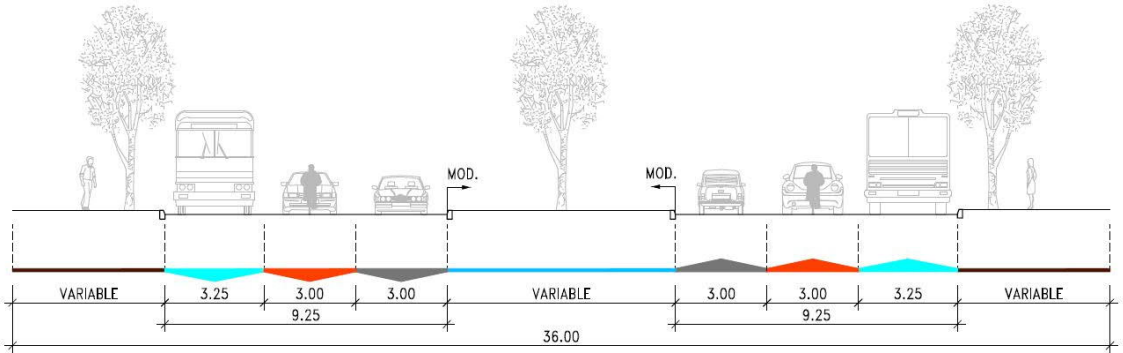
Measure outputs

The measure initially expected to provide the following outputs:

- A preliminary study with different solutions for high-level-of-service bus corridors in the eastern periphery of Madrid
- A construction project for the implementation of a pilot 3.6-km section.
- The construction and operation of the pilot section, including rearrangement of cross-road; parking facilities; new signals; adapt bus stops; and connection with other intermodal PT facilities.
- Operation of bus lines.
- Monitoring of performance of the pilot section.

As the implementation of the pilot section was dismissed by the City Council, the scope of the measure changed, including the following output:

- A stated-preference survey of the design solutions provided by the construction project, addressed to residents and corridor users.



Street cross-section of the corridor in one of the nine stretches.

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Indicators

No.	Indicator	Data units	Frequency B – I (xx) – A	Method DC-E-S-C	Observed group	Area of measurement
4	Modal shift	Number of trips	A	Survey	Pilot section bus users	Pilot section
1	System usage	Number of trips	B – A	Survey	Pilot section bus users	Pilot section
2,3	Commercial speed	km/h	B - A	Data collection	Pilot section bus users	Pilot section
	Satisfaction	Score (1-5)	A	Survey	Pilot section bus users	Pilot section
5	Emissions CO2	tons / year	B – A	Estimation	Pilot section bus users	Pilot section
5	Emissions NOx	tons / year	B – A	Estimation	Pilot section bus users	Pilot section
5	Emissions PM	tons / year	B – A	Estimation	Pilot section bus users	Pilot section
	Investment costs	EUR	A	Data collection		Pilot section
	Operational costs	EUR/veh-km	A	Data collection		Pilot section
Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period						

Indicators results*

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Diffe-rence After-Before	Net impact After–BaU
Modal shift	Trips/day	0	2019	0	2019	1214	2019	1214	**1214**
System usage	Trips/day	37909	2019	37909	2019	39123	2019	1214	**1214**
Commercial speed	km/h	9.3	2019	9.3	2019	14.0	2019	4.7	**4.7**
Satisfaction	Score (1-5)	3.6	2019	3.6	2019	NA	2019	NA	**NA**
Emissions CO2	tons / year	11507.7	2019	11507.7	2019	11135.1	2019	-372.6	**-372.6**
Emissions NOx	tons / year	26.38	2019	26.38	2019	26.15	2019	-0.2287	**-0.2287**
Emissions PM	tons / year	1.10	2019	1.10	2019	1.07	2019	-0.0328	**-0.0328**
Investment costs	M.EUR	0	2019	0.00	2019	4.25	2019	4.25	**4.25**
Operating costs	**EUR/veh-km**	**NA**	**2019**	**NA**	**2019**	**NA**	**2019**	**NA**	**NA**

* As the corridor has not been implemented, measure results can only provide an estimate of what would happened if the measure had taken place. These results are based in the study completed by CRTM in December 2019

Potential results*

- **The implementation of the measure could add 1,214 additional bus trips per day in the corridor, from former car users.**
- **The potential for modal shift from car use is estimated to be around 3,2%.**
- **Commercial speed could reach at least 14 km/h if the project is implemented.**
- **The potential for emission reduction is low due to the modest number of trips changing from private car to buses.**
- **Operational costs are not expected to change significantly, as the speed increase is not too significant and the additional demand does not require to introduce additional buses.**
- **Public transport users' satisfaction would be likely to increase in a moderate way in case the project was built.**

*** I**n accordance with the CRTM's study**.**

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Objective and target*

No.	Objective and target	Rating	Comment
1	To increase bus patronage [no quantitative target]	O	**probably ✶✶ if implemented**
2	To increase commercial speed in the selected sections by 10%, reaching 13 km/h	O	**probably ✶✶✶ if implemented**
3	To increase regularity levels (by 9%, reaching an average of 94%)	O	**probably ✶ if implemented**
4	To contribute to the city level objective of increasing modal share for PT by 4%	O	**probably ✶ if implemented**
5	To contribute to the air quality plan objectives to reduce emission levels and improve air quality [30% reduction in energy consumption and emissions]	O	**probably O if implemented**

NA = Not Assessed **O = Not Achieved** **✶ = Substantially achieved (at least 50%)** **✶✶ = Achieved in full** **✶✶✶ = Exceeded**

* As the infrastructure has not been constructed, the measure's objectives have not been achieved. However, it is still possible to discuss whether these objectives could have been achieved, taking into consideration the survey completed in September 2019 and the technical study delivered by CRTM in December 2019

Lessons learned

- The implementation of innovative measures requiring physical interventions in the public space with significant public investment require to build up in advance strong support among decision makers.
- Such support seems more difficult to build up in the case of tangential corridors (in contrast with traditional radial corridors).
- Tangential corridors also seem to offer less potential for modal change from private cars. Accordingly, the emissions saved by the implementation of such corridors are not significant.
- Car restrictions on the corridor are likely to significantly improve the performance of such measures: on the one hand, encouraging more car users to look for sustainable mobility alternatives; on the other hand, by reducing the road space required in the corridor, and the investment resources to be mobilised.

Upscaling in Madrid

- There are no concrete plans for scaling up this measure. There is no evidence that the municipality has changed its previous position concerning the implementation of this corridor. Besides, there have not been actions to push forward any of the other bus corridors identified in the 2013 local SUMP and regional SUMP.
- The context could change once the current revision of the SUMP is completed, which is expected to happen in 2020.

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MAD 5.8

Electric and hybrid buses for public transport

Measure leader: Sergio Fernández Balaguer (Madrid City Council)

Partners

Madrid Municipal Transport Company (EMT)

Madrid Regional Transport Consortium (CRTM)

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Main goals of MAD 5.8

- To increase the efficiency and environmental performance of the public transport bus fleet in Madrid;
- To provide a more attractive offer of public transport to compete with private car use;
- To help developing guidelines and recommendations for selecting major fleet renewal to be undertaken in the upcoming years.

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Measure outputs

- 9 hybrid buses were added to the EMT fleet;
- Monitoring the performance of these new buses under real conditions while operating on EMT route 140, a tangential bus line close to the living lab;
- Assessing and comparing the different technologies (standard buses versus new ones);
- Developing recommendations for future fleet renewal, based on the operation of this type of vehicles and technology.

Indicators

No.	Indicator	Data units	Frequency B – I – A	Method DC-E-S-C	Observed group	Area of measurement
1	Bus service	km	B - I - A	Data collection	New buses	Line 140
2	Satisfaction	Score (1-5)	I – A	Survey	Users of new buses	Line 140
3	Emissions CO2	tons	B – I – A	Data collection	New buses	Line 140
4	Emissions NOx	tons	B – I – A	Data collection	New buses	Line 140
5	Emissions PM	tons	B – I – A	Data collection	New buses	Line 140
6	Energy efficiency	MJ/km	B – I – A	Data collection	New buses	Line 140
7	Operating costs	EUR/km	B – I - A	Data collection	New buses	Line 140
8	Investment costs	EUR	B	Data collection	New buses	
Frequency: B: Before – I: Intermediate - I(x): Intermediate(frequency) – A: at the end of the CIVITAS operation period						

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Indicators results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Difference After-Before	Net impact After–BaU
Bus service	km/yr	479,279	2017	476,440	2019	476,440	2019	-2,840	**0**
Satisfaction	Score (1-5)	3	2017	3	2019	4.2	2019	1.2	**1.2**
Emissions CO2	tons/yr	699.6	2017	695.5	2019	549.1	2019	-150.5	**-146.4**
Emissions NOx	tons/yr	4,355	2017	4.329	2019	1.162	2019	-3.193	**-3.167**
Emissions PM	tons/yr	0.09266	2017	0.09211	2019	0,05598	2019	-0.03668	**-0.03613**
Energy efficiency	MJ/km	19.515	2017	19.515	2019	15,481	2019	-4.035	**-4.035**
Operating costs	EUR/km	66.67	2017	66.67	2019	32,37	2019	-34.30	**-34.30**
Investment costs	**EUR**	**232,853**	**2008**	**264,521**	**2017**	**335,294**	**2019**	**102,441**	**70,773**

Main results

- **Passengers riding L140 expressed a high level of satisfaction with the new buses, with a 4.2 score over 5, compared to a 3 score to the old buses**
- **69% considered highly adequate to dedicate municipal funding to this (a score of 4.5 over 5).**

- **CO2 emissions and energy consumption have been reduced by 21%;**
- **NOx emissions have been reduced by 73%;**
- **PM emissions have been reduced by 39%;**

- **Investment costs are 39% higher for hybrid buses compared to the Euro IV diesel buses they have replaced.**
- **Taking into consideration the full mileage provided by the 9 hybrid buses and a service life of 10 years, the GHG emission abatement cost is €24/ton CO2.**
- **Operating costs have been cut by more than half (51.4% reduction), from €66.67(100 km to €34.30/100 km.**

Objective and target

No.	Objective and target	Rating	Comment
1	Energy consumption (and emissions) reduced by 30%	Substantially achieved (at least 50%)	Energy consumption and CO2 emission reduction above 20% on L140. They could have been higher if the hybrid buses had provided more km on this route, instead of diesel buses.
2	Noise reduction, due to the use of alternative technologies	Achieved in full	33.8% of the L140 passengers considered that the new buses were less noisy than the previous ones. This was the difference noticed by a higher number of respondents, followed by “more comfort” (32%)
3	Contribution to the air quality plan objectives	Exceeded	NOx and emission reductions were higher than initially expected (72.7% and 38.9%), contributing substantially the objectives of Madrid’s Air Quality Plan

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Drivers and barriers

- Initially, this measure was expected to interact with measure MAD 5.1, as the buses would be assigned to the high level PT service corridor to be developed under that measure. This option was abandoned due to the changes made in measure MAD 5.1, and the demonstration is being made in one of the bus lines (#140) in the area of the living lab.

Lessons learned

- Hybrid buses provide an effective alternative for the replacement of diesel buses, as they provide CO2 emission and fuel savings of more than 20%, reduction in NOx and PM emissions, and significant customers' satisfaction;
- Noise reduction is the most valued improvement by users;
- Hybrid buses are also economically efficient, as the additional costs can be recovered in less than 5 years, due to fuel and maintenance savings.

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Upscaling in Madrid

- The measure has contributed to establish the EMT fleet renewal plan during these years. The plan's objective is to have a 100% fleet with low or zero emissions vehicles.
- It seems that the role of hybrid vehicles in this renewal plan has been reassessed, though, as the political changes at city level during these years are more favourable towards full electrification, and the market evolution seems to be more favourable to this fact.

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MAD 6.2

Test fleets, policy incentives and campaigns for the uptake of electric vehicles

Measure leader: Enrique García Cuerdo (Madrid City Council)

Partners

Madrid City Council

Madrid Municipal Transport Company (EMT)

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Main goals of MAD 6.2

- Promoting the use of electric vehicles (EV) by the municipality of Madrid, private companies and individuals;
- Increase and optimization of the city charging infrastructure;
- Reducing energy consumption and emissions coming from municipal and private fleets.

Main actions

- Deployment of a lease operation scheme and a decentralised management system that allowed to accelerate the inclusion of EVs in the city fleet;
- A much higher number of vehicles than initially expected: 207 e-cars in the city fleet in January 2019;
- Development of recharging infrastructure in more than 35 municipal buildings;
- 5 fast charging stations opened in different EMT-managed public parking facilities during 2018;
- The Madrid City Council has launched 3 tenders for the supply of public access fast charging network in the following years: 2017 (14 equipment), 2018 (32 equipment) and 2019 (52 equipment).
- Monitoring of 19 EVs of the "Waste collection inspection service“ fleet for evaluation purpose.

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Indicators

No.	INDICATOR	DATA UNITS	FREQUENCY B – I (XX) – A	METHOD DC-E-S-C	OBSERVED GROUP
1	CO2 emissions per year	Tons	B – A	Estimation	Municipal EV fleet
2	NOx emissions per year	Tons	B – A	Estimation	Municipal EV fleet
3	PM emissions per year saved	Tons	B – A	Estimation	Municipal EV fleet
4	Average energy consumption	MJ/km	B – A	Estimation	Municipal EV fleet
5	VKM travelled (monthly or yearly average)	Km	B – A	Data Collection	Municipal EV fleet
6	Total costs	EUR/km	B – A	Data Collection	Municipal EV fleet
7	Use of new EMT charging points (monthly or yearly average)	Quantity	A	Estimation	EMT charging points
8	Use of new EMT charging points (monthly or yearly average)	kWh/year	A	Estimation	EMT charging points

Frequency: B: Before – A: at the end of the CIVITAS operation period

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Indicators results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Difference After-Before	Net impact After–BaU
CO2 emissions	Tons/year	52.359	2017	52.359	2019	8.666	2019	-43.693	**-43.693**
NOx emissions	Tons/year	0.0205	2017	0.0224	2019	0	2019	-0.0205	**-0.0224**
PM emissions	Tons/year	0.0070	2017	0.0070	2019	0	2019	-0.0070	**-0.0070**
Energy consumption	TJ/year	0.7259	2017	0.7259	2019	0.1268	2019	-0.5991	**-0.5991**
Distance travelled	km	229,808	2017	229,808	2019	229,808	2019	0	**0**
Operating costs	EUR/year	93,694	2017	93,694	2019	104,648	2019	10,954	**10,954**
Use of new EMT charging points	Quantity	0	2017	0	2019	5	2019	5	**5**
Use of new EMT charging points	**kWh/year**	**0**	**2017**	**0**	**2019**	**37,814**	**2019**	**37,814**	**37,814**

Main results

- **83% reduction in annual CO2 emission;**
- **100% reduction in annual Nox emissions;**
- **100% reduction in annual PM emissions.**

- **83% reduction in energy consumption;**

- **11% increase in operating cost.**

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Objective and target

No.	OBJECTIVE AND TARGET	RATING
1	At least 20 electric vehicles in the municipality fleet (to be translated into energy, emission reduction)	**Exceeded**
2	Deployment of at least 3 new fast charging stations	**Exceeded**
3	Agreement with 5 companies to procure electric vehicles for their fleets	Not Achieved*

* In spite of the measure team efforts, none of the companies approached added e-cars to their fleets.

Lessons learned

- **E-cars provide substantial reductions in CO2 and pollutant emissions as well as in energy use (83% to 100%), without any drawbacks in terms of reliability and performance of the fleet. In spite of energy cost savings, abatement costs remain high, but are expected to decrease as new e-car models enter the market.**
- **The ability of local governments to stimulate and support the electrification of private fleets is limited. This is due to the higher cost, low priority that most corporate boards pay to fleet-related questions, to the fact that fleet-renewal decisions are taken only when the lifetime of the existing vehicles is close to termination, and to the still widely-perceived uncertainty regarding EV technology.**
- **Limited offer of electric vehicle models on the market and difficulties in covering certain uses (heavy vehicles, long distances).**
- **Deployment of charging network in municipal facilities has great technical and administrative complexity. Power expansion works is often needed.**
- **Development of public access recharging network: works are expensive, complicated and require time. Some companies do not offer products with sufficiently tested quality.**
- **Low level of use of the fast charging infrastructure. User prefers to charge the vehicle at home or at work (it is cheaper and more convenient).**
- **The greatest boost to electric mobility in Madrid has come from regulatory and normative actions (Mobility Ordinance, Central Madrid) and incentives (parking priority, bonuses, subsidy programs)**

MAD 6.2

Test fleets, policy incentives and campaigns for the uptake of electric vehicles

Measure leader: Enrique García Cuerdo (Madrid City Council)

Partners

Madrid City Council

Madrid Municipal Transport Company (EMT)

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Main goals of MAD 6.2

- Promoting the use of electric vehicles (EV) by the municipality of Madrid, private companies and individuals;
- Increase and optimization of the city charging infrastructure;
- Reducing energy consumption and emissions coming from municipal and private fleets.

Main actions

- Deployment of a lease operation scheme and a decentralised management system that allowed to accelerate the inclusion of EVs in the city fleet;
- A much higher number of vehicles than initially expected: 207 e-cars in the city fleet in January 2019;
- Development of recharging infrastructure in more than 35 municipal buildings;
- 5 fast charging stations opened in different EMT-managed public parking facilities during 2018;
- The Madrid City Council has launched 3 tenders for the supply of public access fast charging network in the following years: 2017 (14 equipment), 2018 (32 equipment) and 2019 (52 equipment).
- Monitoring of 19 EVs of the "Waste collection inspection service“ fleet for evaluation purpose.

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Indicators

No.	INDICATOR	DATA UNITS	FREQUENCY B – I (XX) – A	METHOD DC-E-S-C	OBSERVED GROUP
1	CO2 emissions per year	Tons	B – A	Estimation	Municipal EV fleet
2	NOx emissions per year	Tons	B – A	Estimation	Municipal EV fleet
3	PM emissions per year saved	Tons	B – A	Estimation	Municipal EV fleet
4	Average energy consumption	MJ/km	B – A	Estimation	Municipal EV fleet
5	VKM travelled (monthly or yearly average)	Km	B – A	Data Collection	Municipal EV fleet
6	Total costs	EUR/km	B – A	Data Collection	Municipal EV fleet
7	Use of new EMT charging points (monthly or yearly average)	Quantity	A	Estimation	EMT charging points
8	Use of new EMT charging points (monthly or yearly average)	kWh/year	A	Estimation	EMT charging points

Frequency: B: Before – A: at the end of the CIVITAS operation period

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Indicators results

Indicator	Unit	Before	Date Before	BaU	Date BaU	After	Date After	Difference After-Before	Net impact After–BaU
CO2 emissions	Tons/year	52.359	2017	52.359	2019	8.666	2019	-43.693	**-43.693**
NOx emissions	Tons/year	0.0205	2017	0.0224	2019	0	2019	-0.0205	**-0.0224**
PM emissions	Tons/year	0.0070	2017	0.0070	2019	0	2019	-0.0070	**-0.0070**
Energy consumption	TJ/year	0.7259	2017	0.7259	2019	0.1268	2019	-0.5991	**-0.5991**
Distance travelled	km	229,808	2017	229,808	2019	229,808	2019	0	**0**
Operating costs	EUR/year	93,694	2017	93,694	2019	104,648	2019	10,954	**10,954**
Use of new EMT charging points	Quantity	0	2017	0	2019	5	2019	5	**5**
Use of new EMT charging points	**kWh/year**	**0**	**2017**	**0**	**2019**	**37,814**	**2019**	**37,814**	**37,814**

Main results

- **83% reduction in annual CO2 emission;**
- **100% reduction in annual Nox emissions;**
- **100% reduction in annual PM emissions.**

- **83% reduction in energy consumption;**

- **11% increase in operating cost.**

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Thank you!

Local Dissemination Manager:

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http://www.civitas.eu

http://www.madrid.es/eccentric

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Cleaner and better transport in cities

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