



Ebus project in Barcelona

5. Internationale E-Bus-Konferenz am 31.Mai und 1.Juni 2016
CityCube, Berlin im Rahmen der Metropolitan Solutions

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Horizon 2020
Programme

Objectives

- Analyse three thematic areas of electric public transport
- Pathway from use case to business case
- 23 Use Cases, 11 cities, 3 thematic pillars

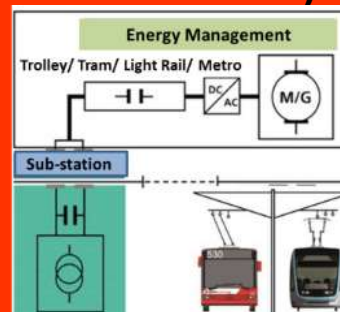
A

Integration of electric buses



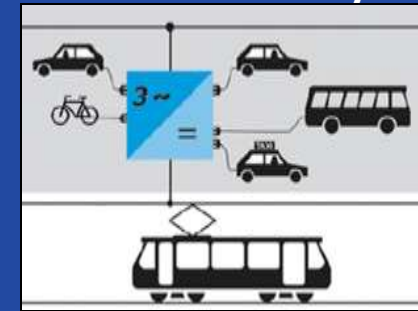
B

Energy storage systems (flywheel/ reversible substations)



C

Multi-purpose use of infrastructure for smart electromobility



ZeEUS project: Barcelona DEMONSTRATION

TEST A: IRIZAR PROJECT: 2 buses

Low Charging station on the depot (Charge Overnight): 80kW

Energy Capacity: batteries (352 kWh) + 5 Ucaps

Operation: 2 buses running in bus line 20 since 2014.



TEST B: SOLARIS PROJECT: 2 buses

Opportunity charging on both terminals with pantograph.

Low Charging station on the depot: 50kW

Fast Charging station on the street: 400kW

Energy capacity: Batteries (125kWh)

Start test: February 2016 Operation: October 2016



New way of operating

BUS LINE: H16 Forum – Passeig de la Zona Franca



Features

- Length: 12.208 m
- Slope: Flat
- Bus stops: 40
- Time service: 17 h
- Interval: 7,6'
- Time Charging: 6,67'
- Commercial Speed: 10, 9km/h

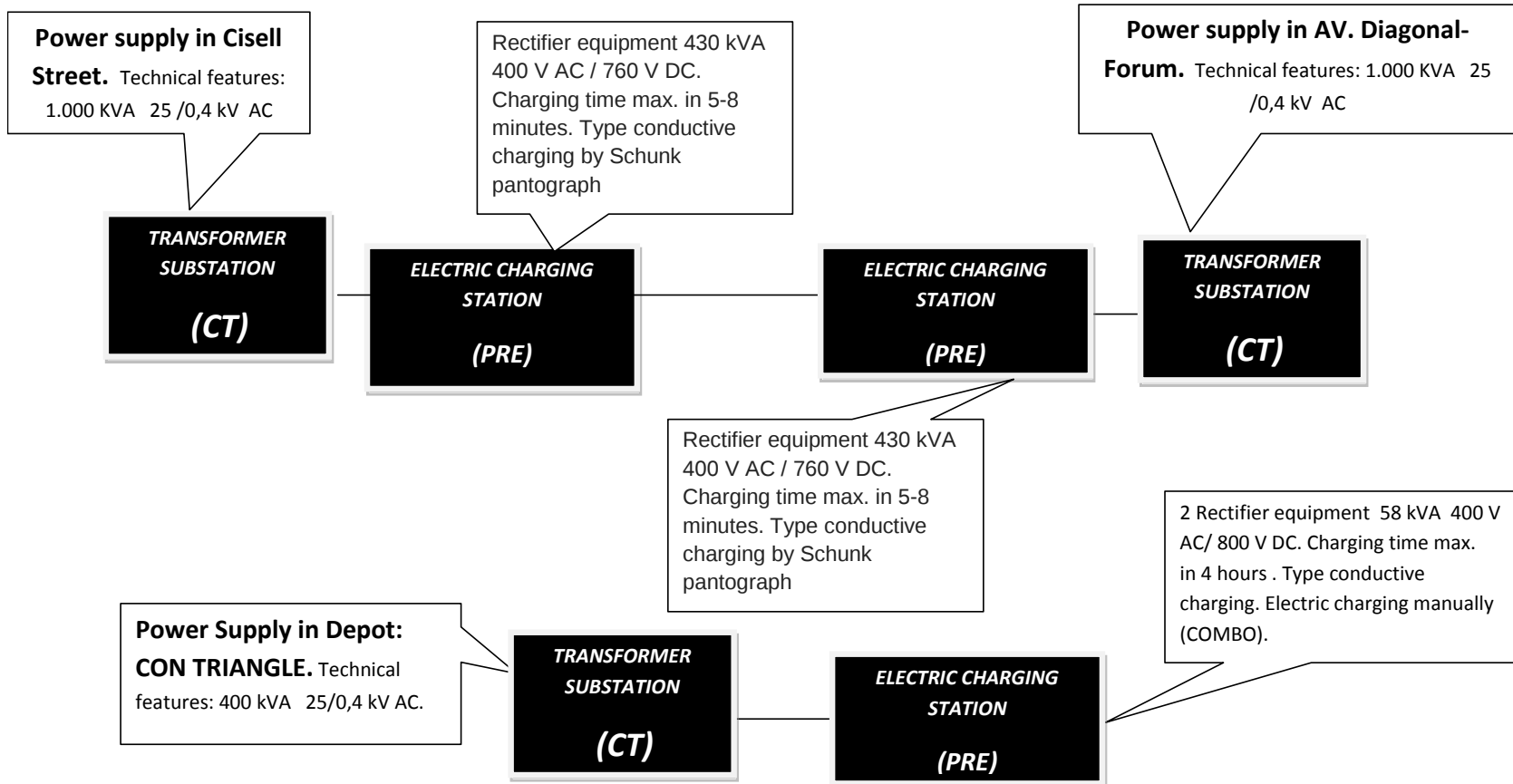


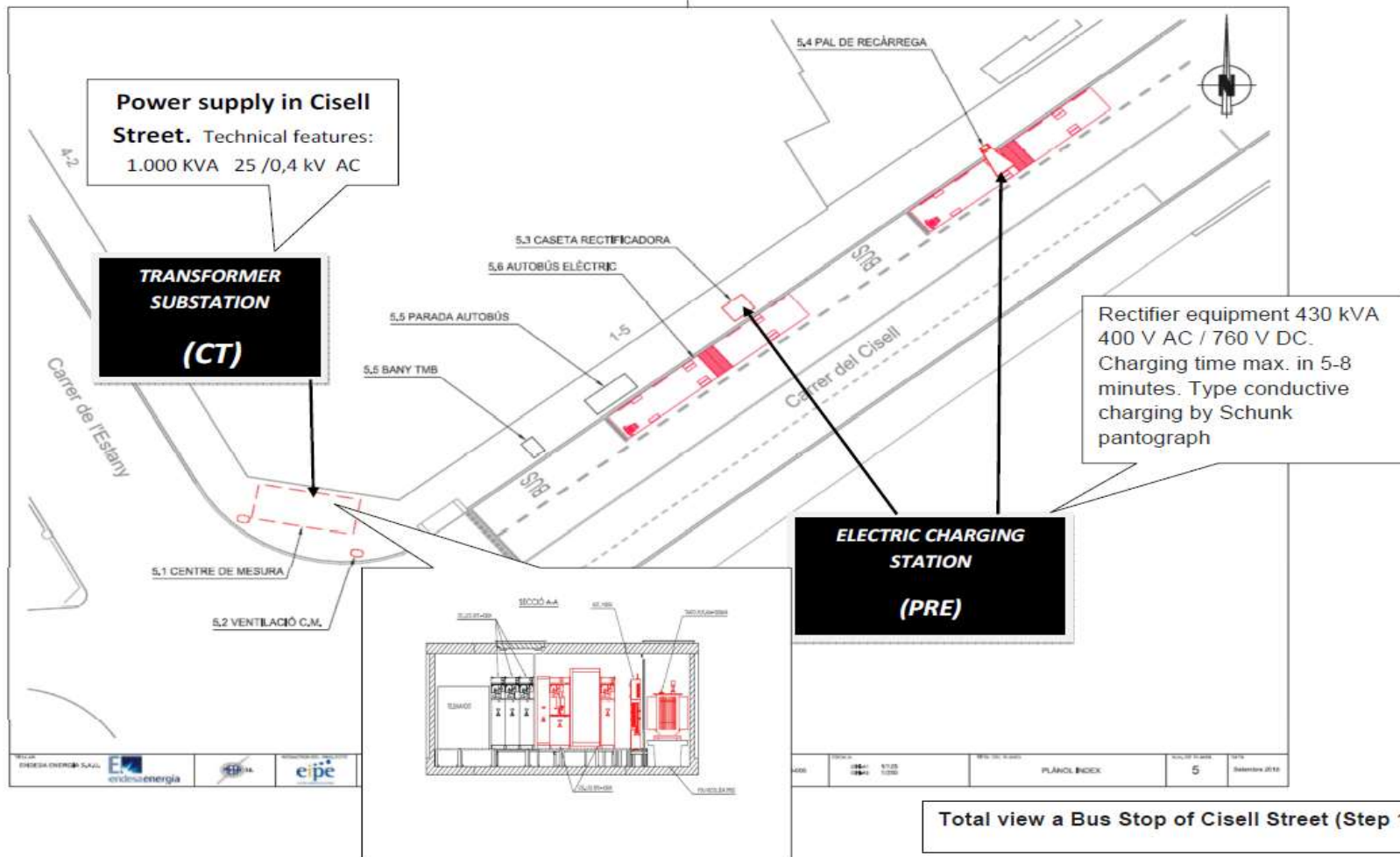
NEW BUS NETWORK

INFRASTRUCTURE OPPORTUNITY CHARGING



ELECTRIC VEHICLE OPPORTUNITY CHARGING INFRASTRUCTURE FEATURES. SERVICE LINE: H-16. (Step 1). (YEAR 2016)



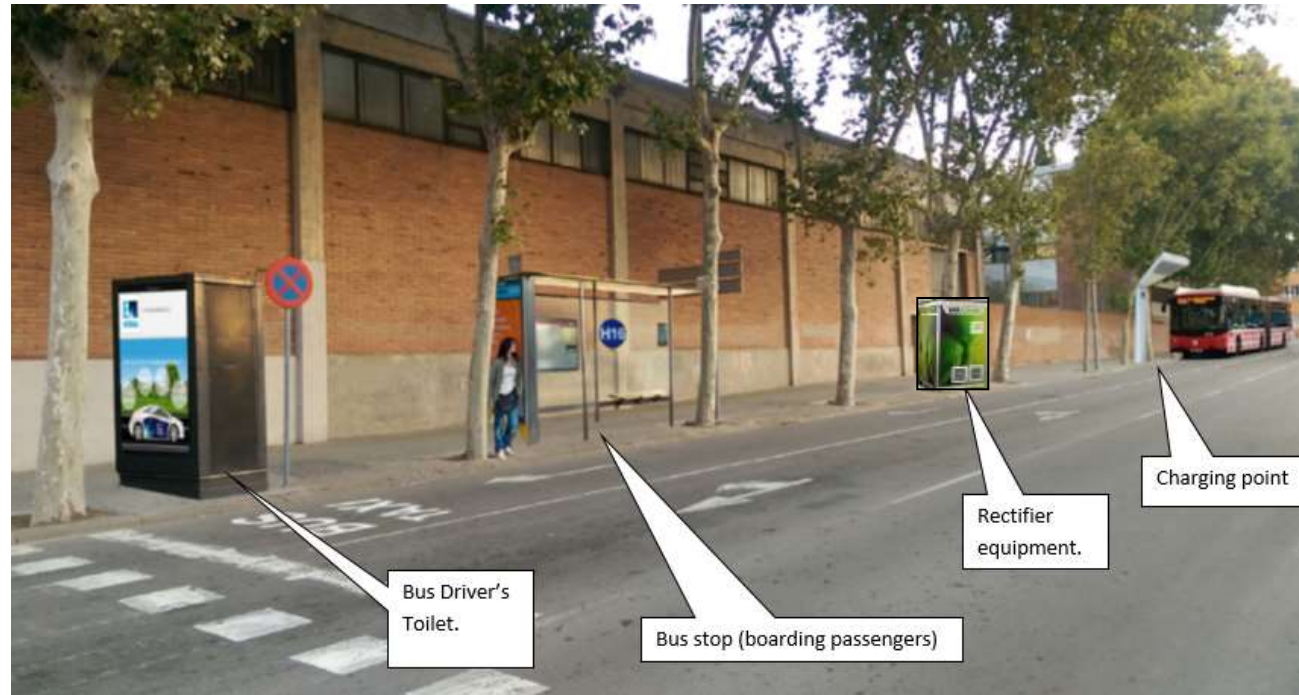


CHARGING STATION ON THE DEPOT



CHARGING STATION

on the STREET: **Terminal 1**



- IN CONSTRUCTION.
- IT WILL BE INSTALLED IN JUNY 2016

CHARGING STATION

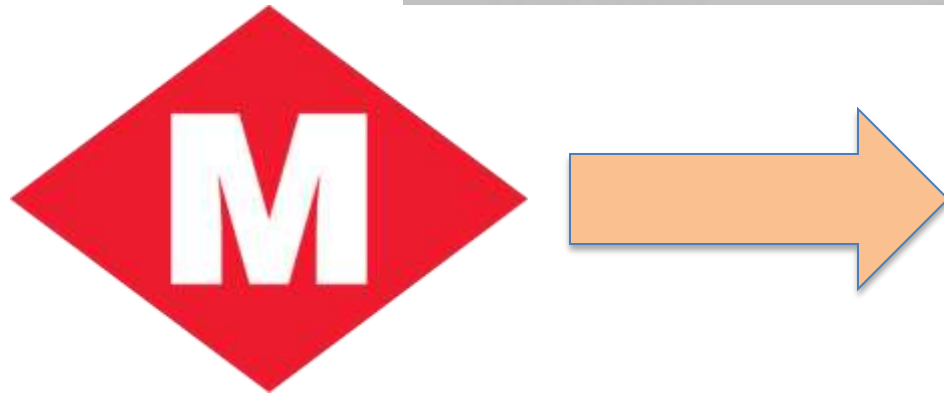
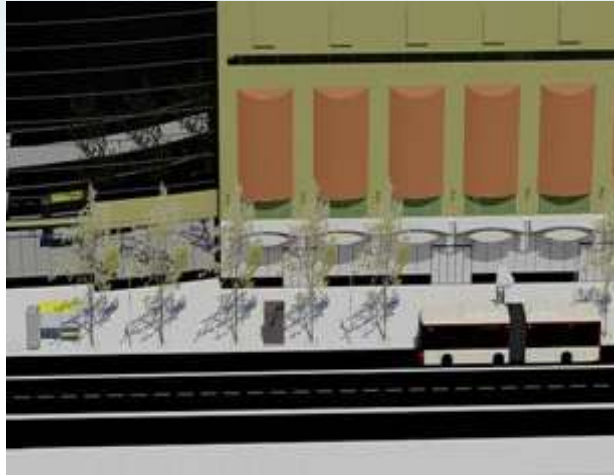
on the STREET: **Terminal 2**



PROCES IN TENDER.

THE CONSTRUCTION IS PLANNED IN OCTOBER 2016.

CHARGING STATION on the DEPOT



PROJECT TENDER IS NOT LAUNCH yet

OPERATIONAL SYSTEM: WHY IS A NEW WAY OF OPERATING???

1.- PLUG IN: on the depot??

2.- FAST CHARGING: on the terminals or bus stops??

3.- LOGISTICS (INFRASTRUCTURE) (Charge management)



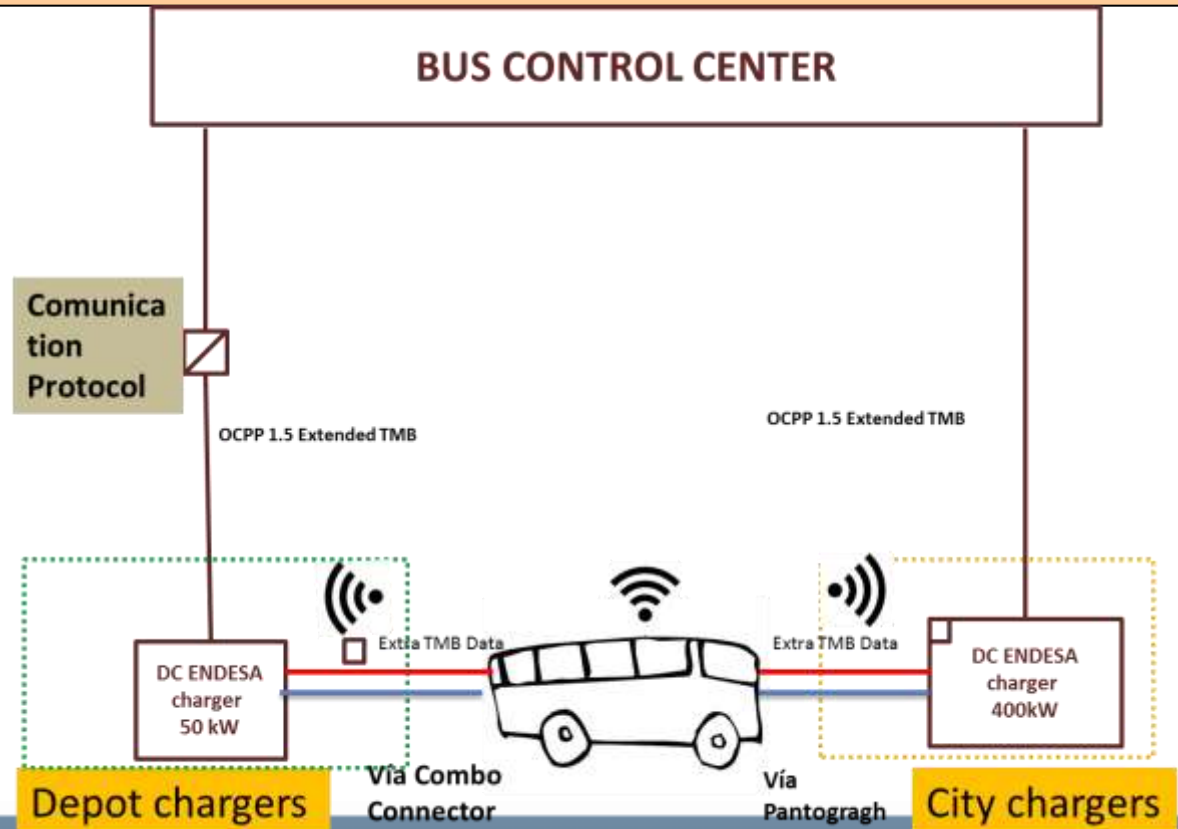
OPERATIONAL SYSTEM:

WHY IS A NEW WAY OF OPERATING???



4.- COMMUNICATION SYSTEM: the bus should be connected to the control center on line. (Management Service Operation)

NEW
CHALLENGE in
ELECTRIC
SYSTEM
(similar to Metro
system)



OPERATIONAL SYSTEM:

WHY IS A NEW WAY OF OPERATING???



5.- TRAINING AND AFTER SALE SERVICE

6.- HOW ACT IN CASE OF FAILURE
(infrastructure): alternative service with diesel buses.

7.- Designing schedule for buses: summer and winter time in the worse conditions.

8.- SIZE OF THE VEHICLES:
autonomy (range)



HOW WE DESIGN ELECTRIC BUS LINES?



Alternatives:

1-0		
0-1		 
1-1		 
2-0	 	
0-2		  
2-2	 	  

HOW WE DESIGN ELECTRIC BUS LINES?



LOOKING FOR STRATEGIC ELECTRIC BUS LINES

BUS LINE	FROM	TO	INTERVAL HEADWAY(min)	NUMBER CHARGING STATION	CONSUMPTION (kWh/km) ESTIMATION			FLEET	NUMBER OF VEHICLES	SHIFTS
D20	Pg. Maritim	Ernest Lluch	5,85	1-1	3	V	V	19	18	18
H4	Zona Unive	Bon Pastor	5,51	1-1	3	X	V	29	29	32
H6	Zona Unive	Fabra i Puig	4,72	1-1	3	X	V	23	24	29
H8	Camp Nou	La Maquinis	6	1-1	3	X	V	24	24	24
H10	Badal	Olimpic de l	6,69	1-1	3	X	V	21	21	23
H12	Gornal	Besòs Verne	6,27	1-1	3	V	V	21	20	20
H14	Paral·lel	Sant Adrià	8,29	1-1	3	V	V	14	12	12
H16	Pg. Zona Fr	Fòrum	7,6	1-1	3	V	V	20	20	20
V3	Zona Franci	Can Carallet	6,71	1-1	3	V	V	15	19	20
V7	Pl. Espanya	Sarrià	5,66	1-1	3	V	V	13	14	17
V11	Estació Ma	Bonanova	8,38	1-1	3	V	V	12	11	11
V13	Pla de Pala	Av. Tibidabo	5,49	1-1	3	V	V	18	17	17
V15	Barceloneta	Vall d'Hebré	6,26	1-1	3	V	V	21	21	21
V17	Port Vell	Carmel	6,44	1-1	3	V	V	16	15	15
V21	Pg. Maritim	Montbau	7,53	1-1	3	V	V	14	12	12
V27	Pg. Maritim	Canyelles	7,13	1-1	3	V	V	18	16	16
TOTAL								298	293	

THANK YOU VERY MUCH

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