

News from Spain

ERESS FORUM 2016

Madrid, May 25

News from Spain

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Energy Management

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Railway Scenario Spain

National Commission on
markets and competition



MINISTERIO
DE FOMENTO

Railway Safety
Agency



Railways Infrastructure Manager

- Own the infrastructure
- Builds new infrastructure
- Maintains Infrastructure
- Manages Infrastructure
- Manages Traffic
- Capacity Planning

renfe

Public Train Operator

- Own the rolling stock
- Maintains Rolling stock
- Commercializes the service
- Pay Fees for capacity

Private Train Operators (8)
Currently only freight operations:



ADIF – ADIF ALTA VELOCIDAD

ADIF Railway Network 2016

Length Rail Network = 15.385 km

Conventional Lines = 12.713 km

High Speed Lines = 2.672 km

Electrified Lines = 9.717 km

1,5 kV dc = 351 km

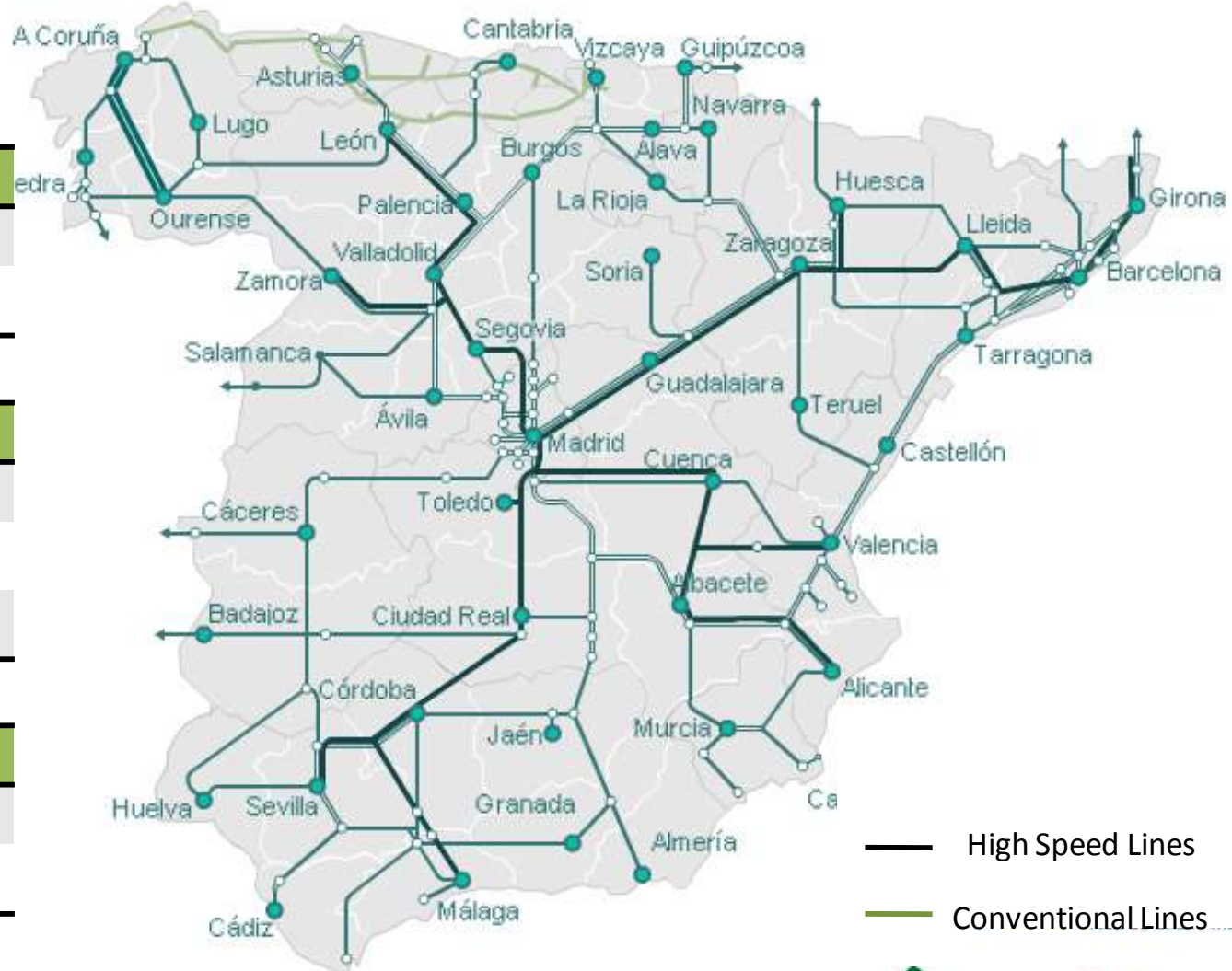
3 kV dc = 6.516 km

25 kV ac = 2.629 km

Km-train electric traction = 82 %

Passenger trains = 90%

Freight trains = 75 %



ADIF – ADIF ALTA VELOCIDAD

2 D. Engineering and Innovation // D. Telecommunications and Energy





Target 2014

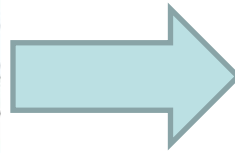
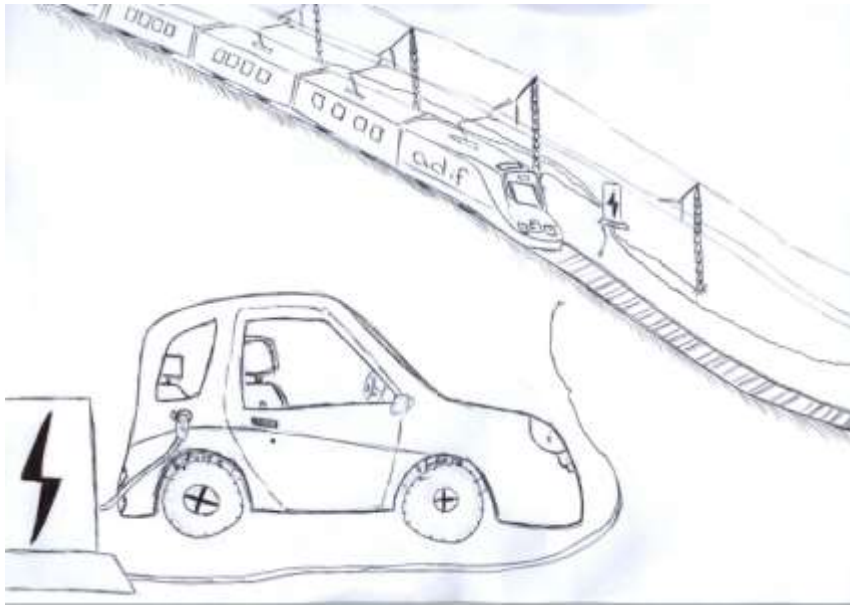
Annual
Saved
Energy

88,58
GWh_{equiv}/year

Target 2020

Annual
Saved
Energy

163,76
GWh_{equiv}/year



ELECTRIC CAR CHAIRGING POINT CONNECTED FROM CATENARY USING THE BRAKE ENERGY.

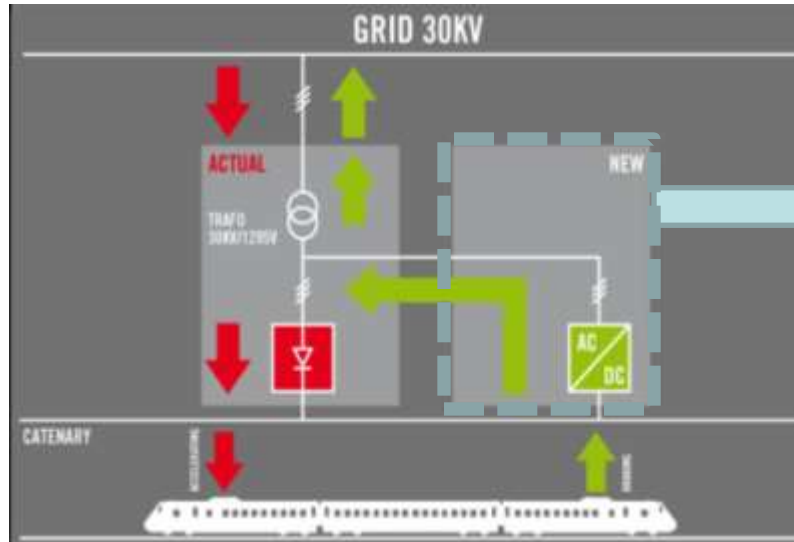
EXPERIMENTAL PROJECT IN OPERATION SINCE 2012. PUBLIC AVAILABLE PARKING HIGH SPEED STATION.



ADIF – ADIF ALTA VELOCIDAD

D. Engineering and Innovation // D. Telecommunications and Energy

I & R Project Breaking Energy: Reversible Substation



INVERTER IGBT, 1 MW



INVERTER ENERGY RECOVERY MODULE IN SUBSTATION 3 kV dc.

EXPERIMENTAL PROJECT IN OPERATION SINCE 2013.
INVERTER IGBT 1MW.
COMMUTER LINE. TRAINS EQUIPPED WITH REGENERATIVE BRAKE.
TRAIN FREQUENCY: 20 MIN.
15 % SAVING ENERGY .
6-8 YEARS PAYBACK TIME STIMATED.

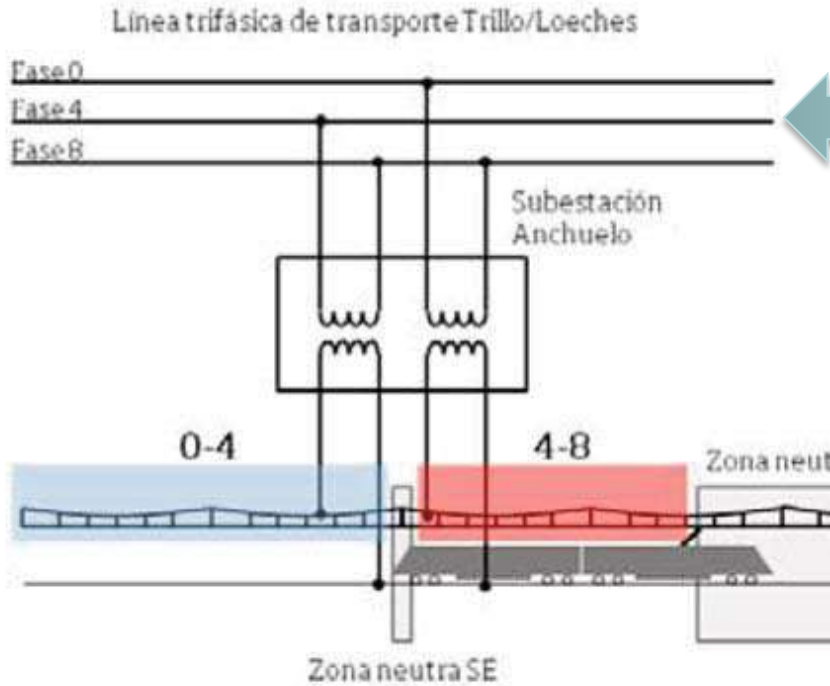
Suburban Málaga-Fuengirola



ADIF – ADIF ALTA VELOCIDAD

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Quality Energy System : SOCRATES



**Quality of Energy
Recieved from the
Network**

EN-50160

**Quality of Energy
delivered to trains**

EN-50163

SOFTWARE: SÓCRATES

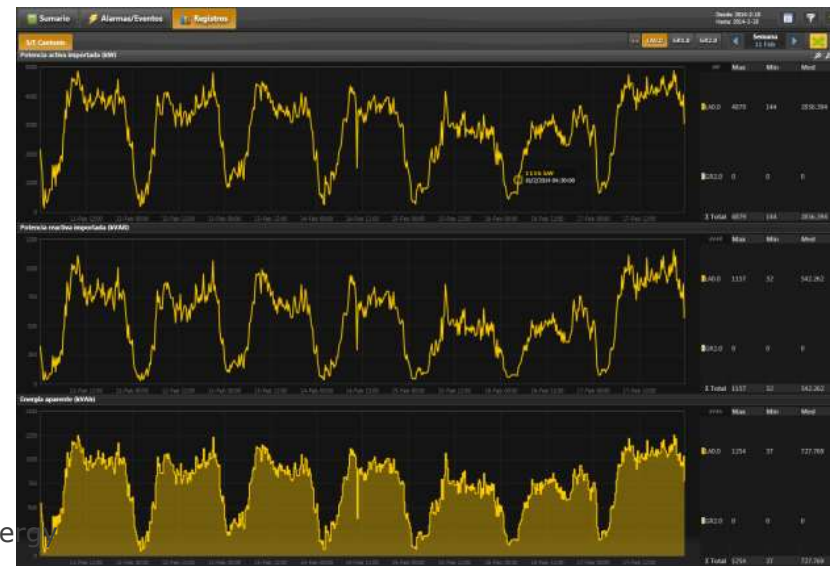
QUALITY ENERGY SYSTEM IN SUBSTATION.

MEASURING THE REQUIREMENTS FOR THE QUALITY OF RETURN BRAKING ENERGY:

- UNBALANCES IN THE NETWORK
- HARMONIC TENSIONS & CURRENTS
- FLICKERS

ADIF – ADIF ALTA VELOCIDAD

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Energy Asset Management

HIGH VOLTAGE LINES



OVERHEAD CONTACT LINE



SUBSTATION



SCADA REMOTE CONTROL SYSTEM



ENERGY KPI BY SPECIALTY

Overhead contact line	Substation	High Tension Line	Energy Remote Control
Obsolescence	Obsolescence	Obsolescence	Obsolescence
Unavailability	Unavailability	State	
Unreliability	Unreliability		
Maintenability	Maintainability		
Costs	Costs		
Geometry and HC wear	Reliability and Non-security of Installations		
Breakdown Typology	State		
POTENTIAL RISK ACTIVITIES			
NET USE FACTOR			BREAKDOWN IMPACT
RISK LEVEL			

ASSET MANAGEMENT SOFTWARE



UIC Rail System Forum: Chairman Energy Sector



RAIL SYSTEM FORUM

TRACK &
STRUCTURE

ROLLING
STOCK

TRAIN-TRACK
INTERACTION

OPERATIONS
AND SIGNALING

ENERGY

ADIF
REPRESENTS
THE
CHAIRMAN
POSITION



ADIF – ADIF ALTA VELOCIDAD

D. Engineering and Innovation // D. Telecommunications and Energy

32 Members UIC



Production:

Energy UIC Leaflets

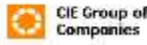
+

Projects in collaboration

UIC ongoing project: Digital Control Substation

Project Leader

10
Members

									
ADIF	CIE	RFI	INFRABEL	PKP	REFER	SNCF	SBB	SZDC	TRAFIKVERKET
SPAIN	IRELAND	ITALY	BELGIUM	POLAND	PORTUGAL	FRANCE	SWITZERLAND	CZECH.REP	SWEDEN

The main objective is to develop the standards to incorporate the digitalization in the substation in order to integrate the performances of energy smart grid in the rail transport.

UIC new proposal project OPT-IN 2017: Guideline Reversible Substation

CALL
OPEN
MEMBERS
UIC



- DEFINITION OF TECHNICAL REQUIREMENTS WHICH MUST BE FULFILLED BY ONE LINE AND ONE SUBSTATION FOR INCORPORATING ONE MODULE OF ENERGY RECOVERY
- DEFINITION OF NEW STANDARD EQUIPMENT TO INSTALL
- PROCEDURES FOR COMMISSIONING AND OPERATION
- PROPOSAL OF DIFFERENT BUSINESS CASES

The main objective of project is to develop the guideline with the technical and economical recommendations for the installation of energy recovery systems in substations.

Energy Management



Energy Management

Mission

MISSION

Energy Management Department

Satisfying the needs of railway undertakings in the field of traction power supply, with criteria of economic efficiency, service quality and environmental respect.

ENERGY
SUPPLIERS



adif
ALTA VELOCIDAD

RAILWAY
UNDERTAKINGS

NO PROFIT ACTIVITY

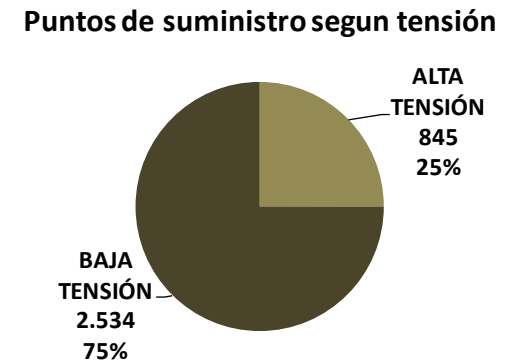
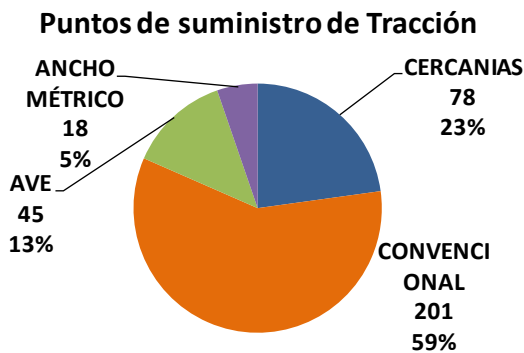
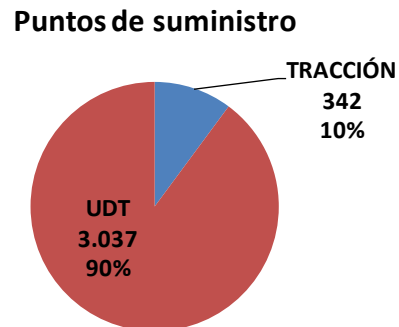
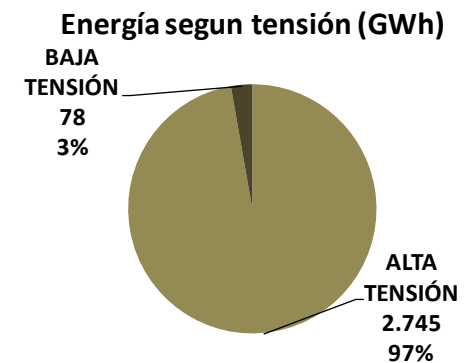
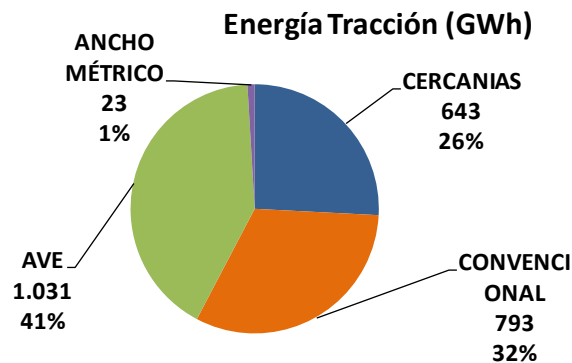
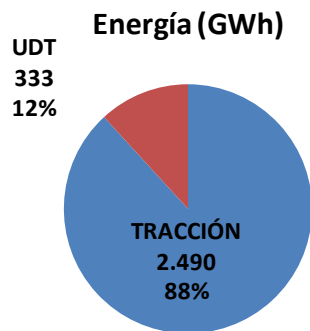
ADIF – ADIF ALTA VELOCIDAD



Energy Management

Some figures (1/2)

2.823 GWh/year y 3.379 energy supply points



Energy Management

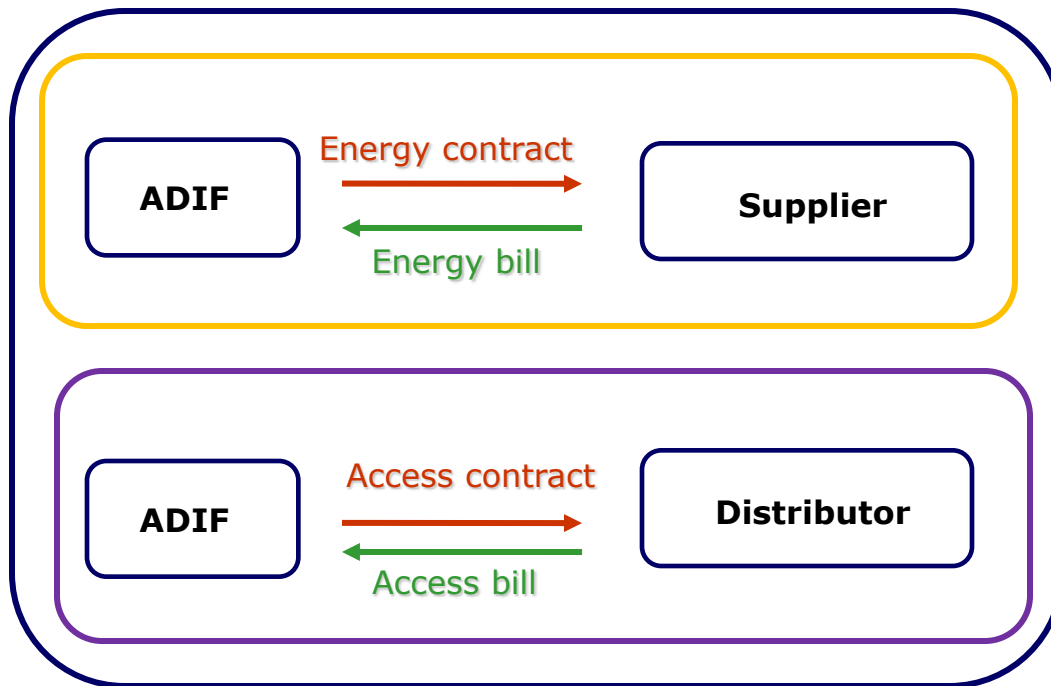
Some figures (2/2)

ADIF is the biggest electricity consumer in Spain, in the service area

Spanish Peninsular Demand 2015 GWh	ADIF AV Consumption 2015 GWh	% ADIF AV / Demand
248.181	2.823	1,14
Average Consumption Spanish Home MWh	2,992	
Number of households equivalent ADIF AV consumption	943.355	

Energy Management

From suppliers ...



Free market activity
Public tender
Manage to get the best prices (methods, markets,...)

Regulated activity
.. and prices
Manage to power contract and coordination with maintenance

Energy Management

.... To Railway Operators

Network Statement. Traction Power Supply

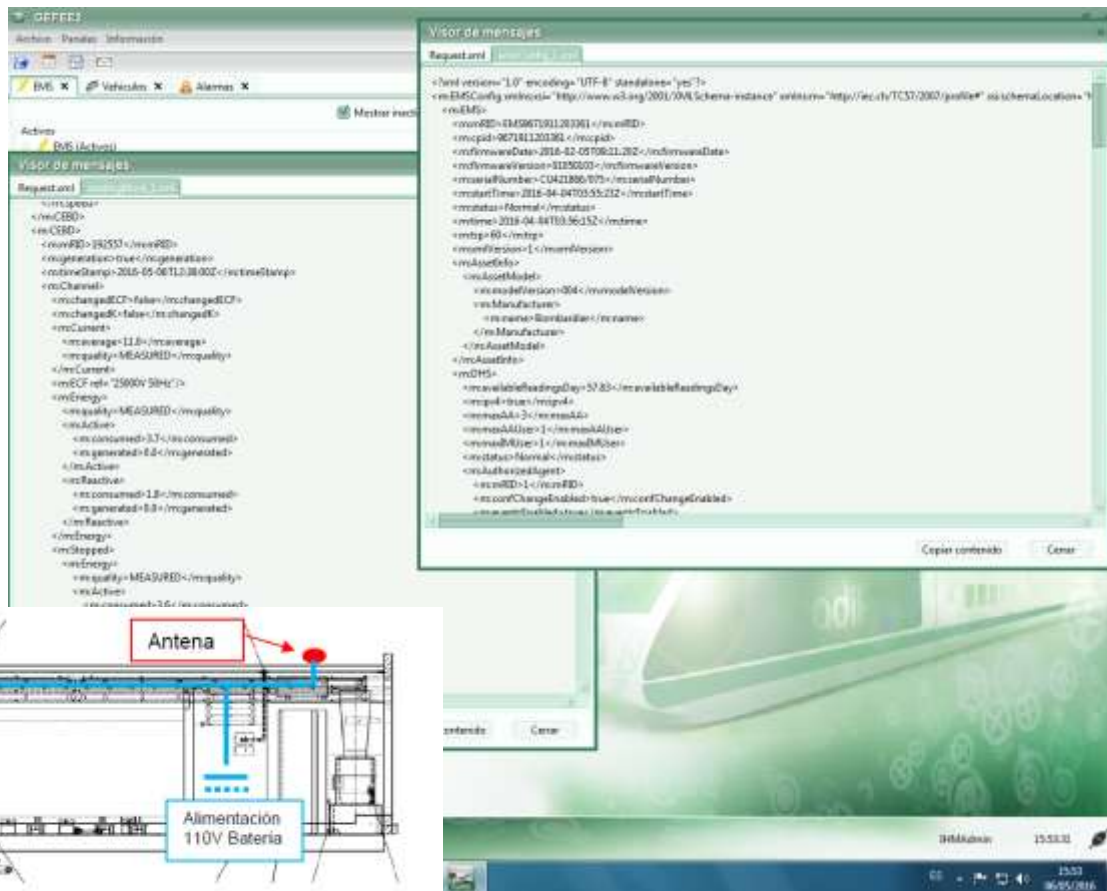
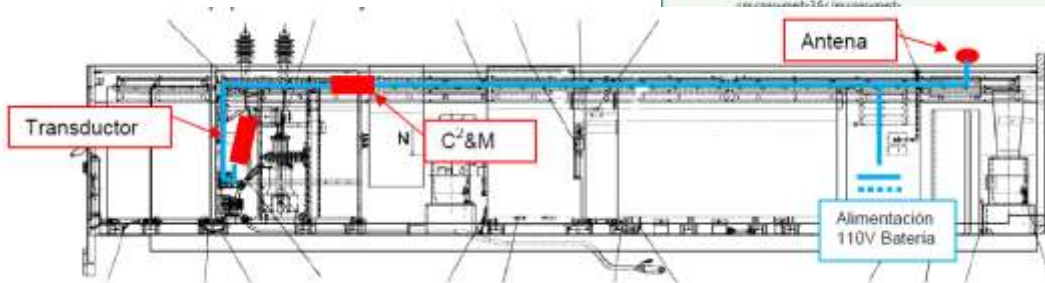
SC-7	Traction Power Supply
Description	This service means the availability of traction electrification on lines with appropriate facilities to provide this service.
Associated Operations	• Contract management of traction power in different electric power markets. • Maintenance of measurement facilities associated to consumption at traction substations. • Management inherent to service provision.
Invoicing Unit	• High Speed Lines: Amount invoiced to Adif by utilities for every electric power station on the lines. • Rest of Lines: TKB.
Application Terms	• No traction power service shall be provided during maintenance periods established. • Adif shall not bear any penalty due to absence of traction power, as a result of failure caused by any Railway Undertaking or as a result of works or maintenance operations properly programmed, or if caused by force majeure.

In accordance with Royal Decree 1044/2013 of 27 December approving the Statute of state-owned company Adif-Alta Velocidad, under article 3.1), Adif-Alta Velocidad shall acquire electric power to supply power to the rail system.

Energy Management

.... To Railway Operators

From indirect methods to energy measurement on trains



Energy Management

Other activities

Getting authorization for returned energy compensation

