

ERTMS on the Spanish commuter network and regional lines.



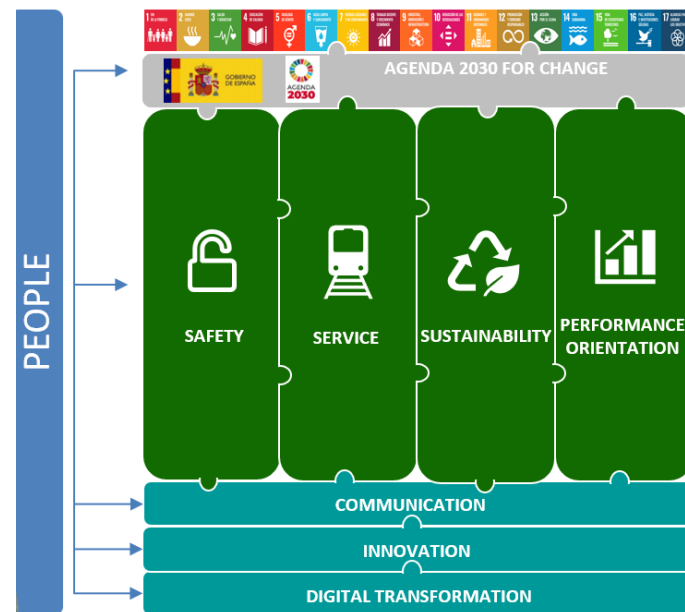
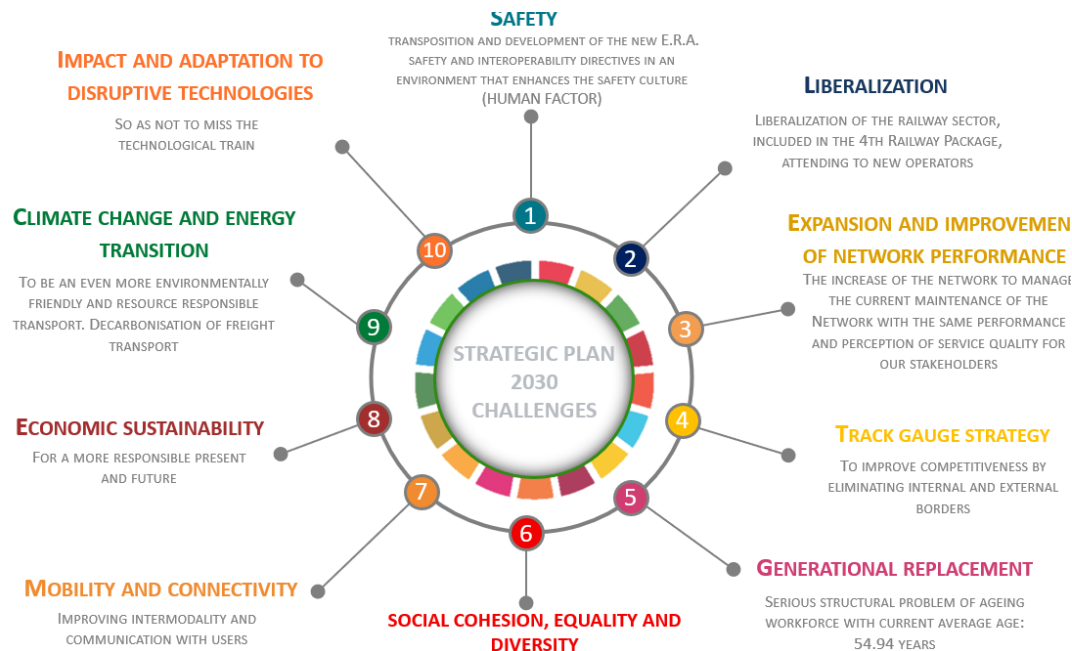


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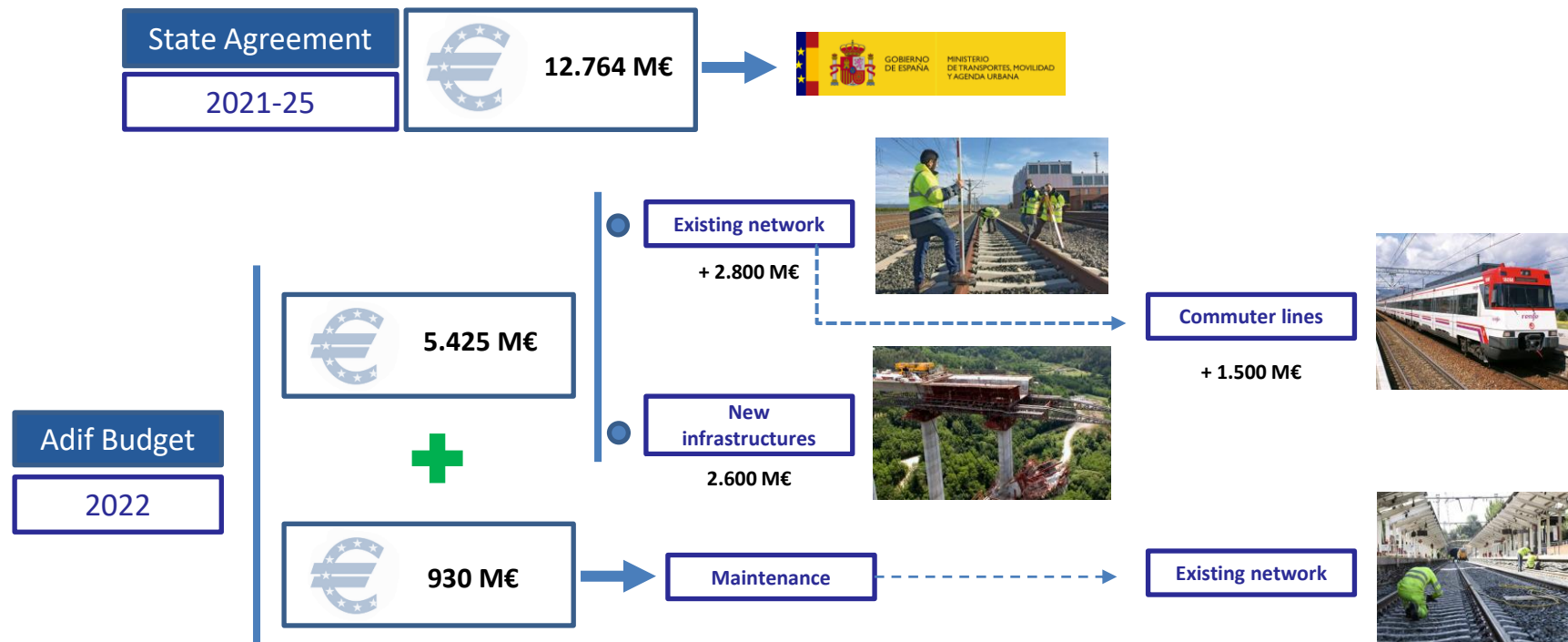
- **Network view (ADIF).**
 - ✓ **ADIF network development plans.**
 - ✓ **Vision for commuter and regional networks: Performance & sustainability.**
- **Technological view (CAF).**
 - ✓ **Return of experience from projects.**
 - ✓ **Short Term & Long Term proposals for commuter and regional lines.**

Strategic Plan 2030.

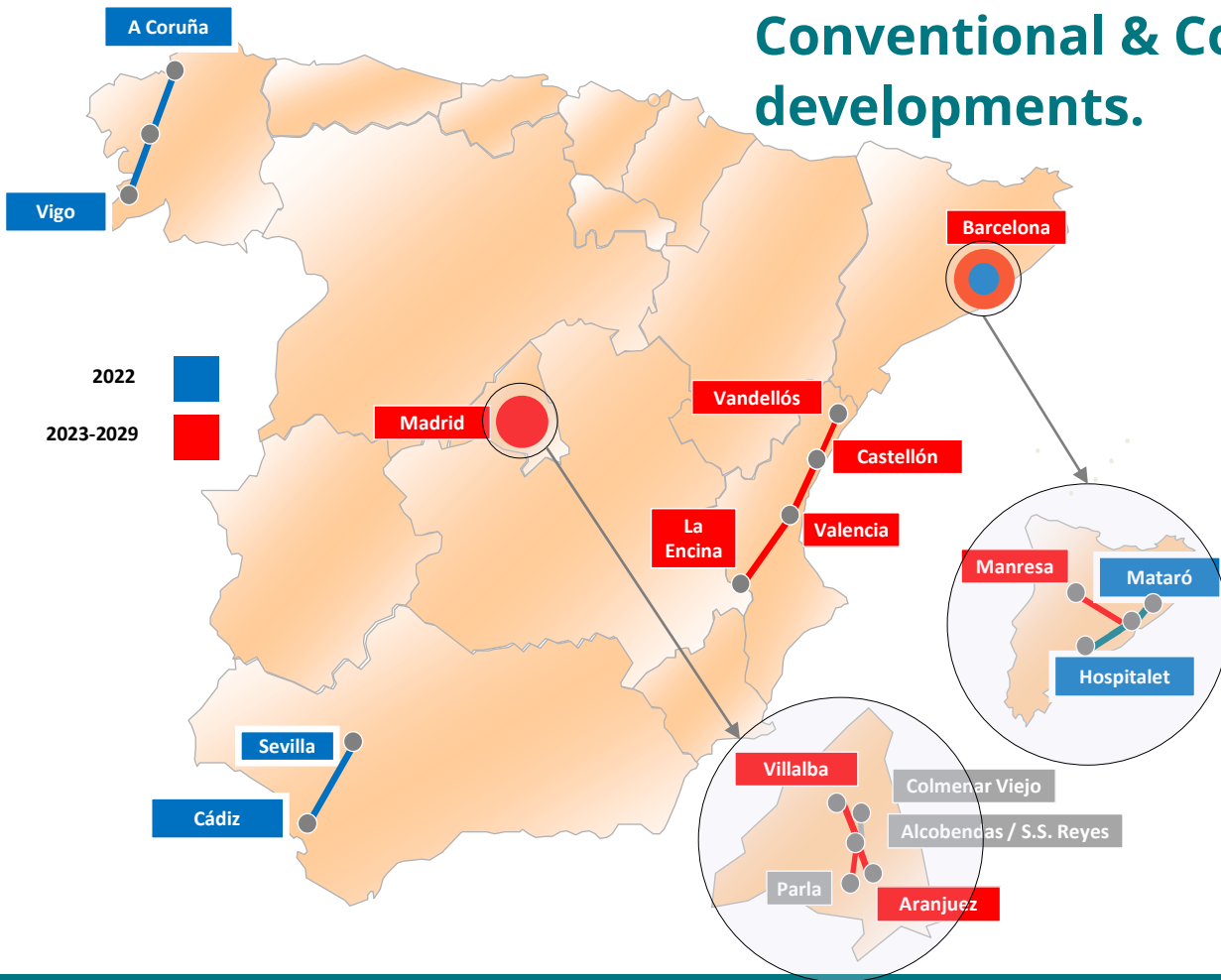


People, as ADIF's driving force, will raise four strategic pillars: Safety, Service, Sustainability & Performance orientation using three transformation levers: Communication, Innovation & Digital Transformation.

ADIF Funding Scheme.



Conventional & Commuter developments.



■ 2022 Milestones. (*)

- Eje Atlántico (L1)
- Sevilla - Cádiz (L1)
- Commuter BCN: Hospitalet - Mataró (L2)

■ 2023-2029 Milestones. (*)

- La Encina – Valencia (L1)
- Valencia – Castellón - Vandellós (L1)
- Commuter BCN:
 - Manresa - Sant Vicent de Calders (L2)
 - Hospitalet – Port Aventura (L2)
 - Bif.Mollet – Castellb. – C. Tunis (L2)
 - La Sagrera-Granollers (L2)
- Commuter MAD:
 - Atocha-Sol-Chamartín (L2) (w. neighbour projects)
 - Atocha-Alcalá de Henares (L2)
 - Aranjuez - Villalba (L2)
 - Atocha-P. Pío-Las Rozas (L2)
 - Atocha-Recoletos-Chamartín (L2)
 - Parla-Alcobendas/Colmenar (L2)
 - Humanes – Atocha - Móstoles (L2)

(*) internal estimated dates subject to change.

≈ 530 L1 km & ≈ 450 L2 km



Further developments on low density regional lines.

- Equal RAMS, more sustainable.
- Simplified L1 still a short term option.
- In parallel, exploring new technological and digital features:
 - ✓ Fail-safe train positioning & digital map.

Technological view

- Return of experience from projects
- Short Term & Long Term proposals for commuter and regional lines



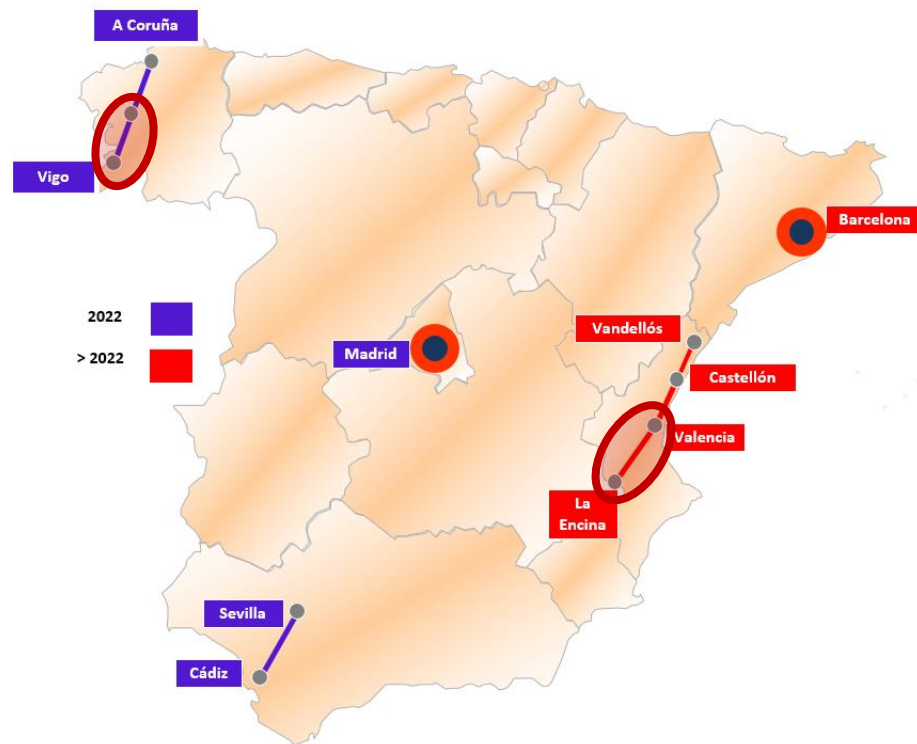
CAF's experience and projects with ADIF

✓ Ongoing projects with ADIF on regional lines

- Vigo – Redondela
- La Encina – Valencia

✓ Main characteristics

- ETCS L1 Baseline 2 overlay over existing signalling installations
- Brown field constraints
- Installation works without disruption in normal operation



CAF's experience and projects with ADIF

✓ Main challenges

- Mixed traffic in La Encina – Valencia & Trains characterization
- Implementing ETCS-IXL interface
- Other changes on the IXL needed



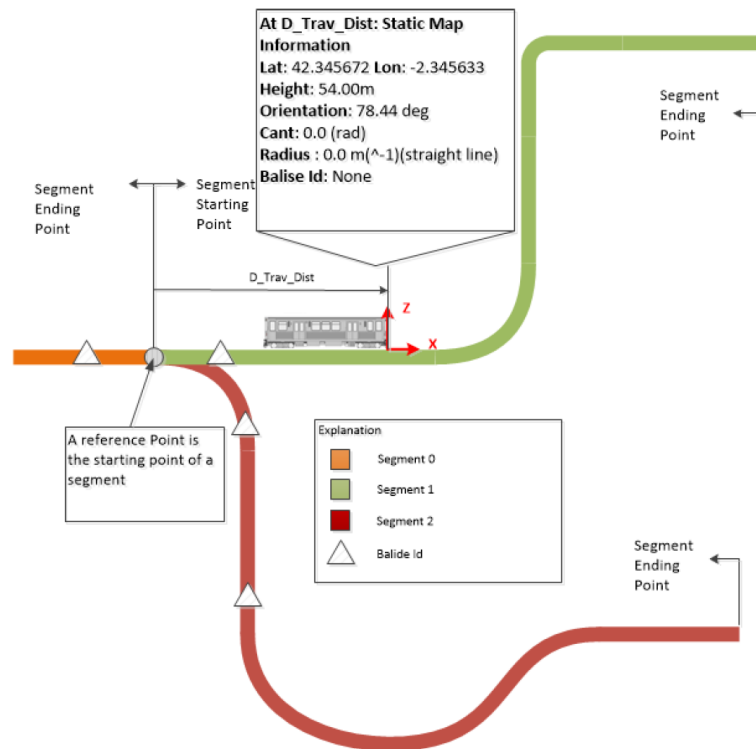
Short term proposals

- ✓ Today many regional lines need to be renewed
- ✓ Different proposals
 - Fully compliant yet simplified ETCS L1
 - Mixed use of centralized and standalone LEU
 - Optimized telegram rules



New proposals for commuter & regional lines

- ✓ Standardized interfaces IXL-ETCS or LX-ETCS
- ✓ Fail-safe train positioning based on sensor fusion and digital map
- ✓ Radio-based ETCS over FRMCS (also use of alternative radio access networks)



Thanks for your attention!



GO ON THE
Right Way