POSTER SESSION

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PRIAC

SCOPE

IP GROUP is responsible for the management of road and railway infrastructures, ensuring the provision of a safe, efficient and sustainable service. PRIAC covers the existing and projected rail, the road network under IP management, and the telematics network that supports both IP's operation and other services.

The rail network has currently about 2 527 km and, in the future, will have around 3 840 km, including high speed which is currently being studied. The main corridors establish the following links: North and South of Portugal through the Atlantic coast; Portugal and Spain through two connections in the north and central region of Portugal (Fig. 1. (a)). The road network currently has about 15 056 km and, in 2030, will have 15 280 km. Portugal has a very extensive road network that covers not only the coast but also the entire interior of the country (Fig. 1. (b)).

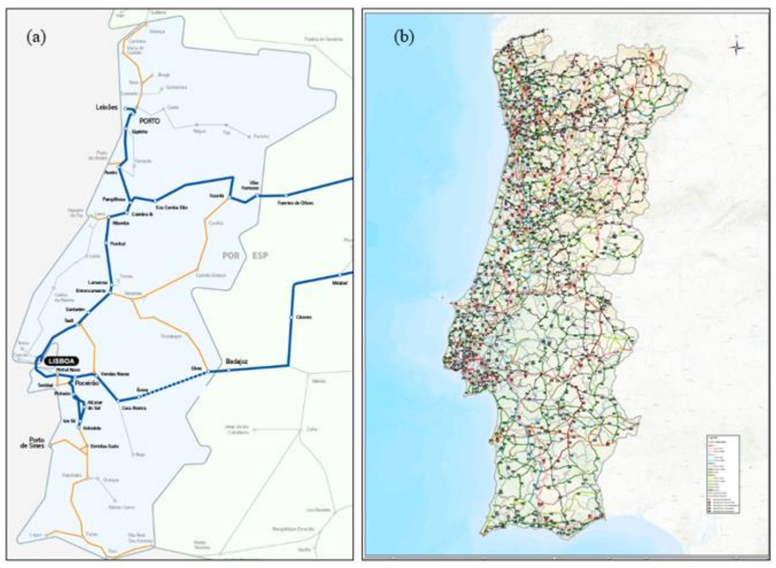

Fig. 1. (a) Rail network; (b) Road network
Source: Infraestruturas de Portugal

The telematic network includes about 6 861 km of optical fiber along rail and road networks and several equipment that can be affected by the climate change effects. These assets are constantly increasing, according to IP and other customers' needs.

METHODOLOGY

PRIAC includes, in a first stage, a climate change vulnerabilities analysis based on historical data, followed by the determination of future climate scenarios with medium and severe consequences and risk analysis, from a technical and socioeconomic point of view. In a subsequent stage, according to the findings of the first stage, it will be reviewed IP regulation and technical standards to accommodate future climate scenarios, and it will be proposed strategic and operational adaptation measures, monitorization plans and the quantification of investment/financing needs, including proposals, if necessary, of resilient investment programs. The Fig. 2 shows PRIAC taskforce vision of the plan.

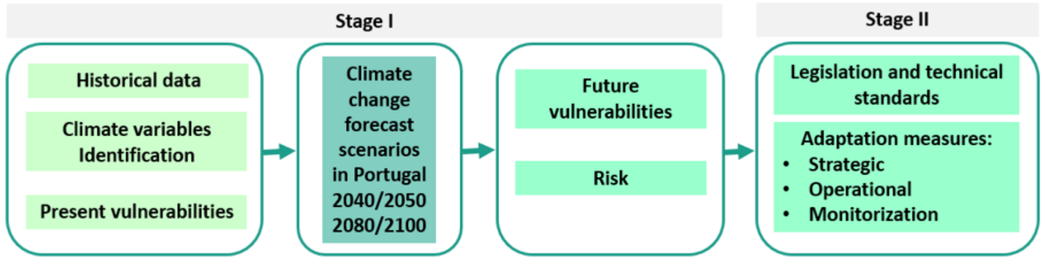

Fig.2. Overview of the PRIAC methodology
Source: PRIAC taskforce

FRAMEWORK AND OBJECTIVES

Transport infrastructure is one of the sectors which is increasingly suffering from the impacts of climate changes, threatening its efficient, sustainable, and safe operation. Considering the adverse forecasts for Portugal climate change, Infraestruturas de Portugal (IP) aims to develop a Climate Change Resilience Plan (PRIAC), to identify risks and impacts on IP infrastructure; to adapt infrastructure at the right time - adaptive management; to support documents to be integrated into IP's management instruments (GIS, strategic – projects and construction, operational – maintenance and operation, life cycle management, funding – EU requirement).
PRIAC is aligned with the decarbonization objectives of the Portuguese economy in 2030/2050 and with the reduction of economic and social economic costs that guide national and European policies.

PRELIMINARY ASSESSMENT OF ACTUAL CLIMATE CHANGES VULNERABILITIES

According to IP data base, heavy rain, strong wind, thunderstorms, extreme temperature, fog, and frost were the main climate events that caused disruptions on the train circulation. For the road, the accidents related with most frequent climate variables were caused by heavy rain. There is no significant historical register of occurrences in the telematics caused by climate events, but the most vulnerable assets were identified.
Fig. 3 shows GIS outputs and Fig.4 telematic assets vulnerabilities.

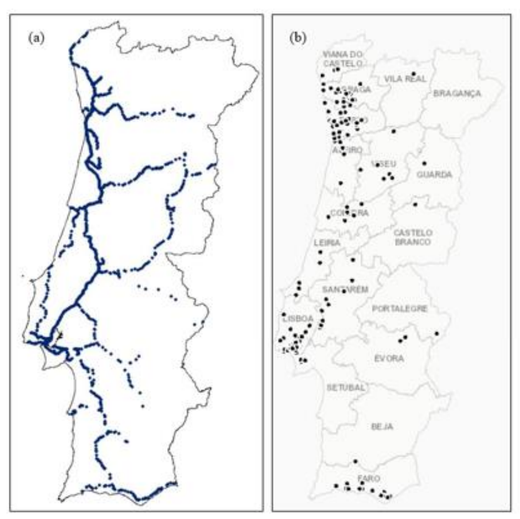

Fig. 3. (a) Rail climate occurrences with at least one train affected, 2021-2022; (b) Road accident blackspots, 2010-2018
Source: Infraestruturas de Portugal

Climate Hazards	Flooding (coastal)	Flooding (fluvial)	Flooding (pluvial)	Embankment landslides and landslides of cut	Extreme temperature (max)	Extreme temperature (min)	Forest fire	Droughts	Extreme wind	Thunderstorms	Frost	Snow	Fog	Flooding (coastal)	Flooding (fluvial)	Flooding (pluvial)	Embankment landslides and landslides of cut	Extreme temperature (max)	Extreme temperature (min)	Forest fire	Droughts	Extreme wind	Thunderstorms	Frost	Snow	Fog
Equipment	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	sensitivity	exposure	Vulnerability
Manhole	1	1	2	4	3	4	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1 8 12 1 2 2 1 1 1 1 1 1 1
Roadside Cabinet	1	1	1	2	3	2	2	3	4	4	3	3	3	2	1	1	1	3	1	1	1	1	1	1	1	1	1 2 6 6 16 9 6 1 1 3 1 1 1
Technical room	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1 1 1 1 1 1 1 2 1 1 1
Overhead cables	1	1	1	1	1	1	2	3	2	2	1	1	3	5	1	1	3	4	1	1	1	1	1	1	1	1	1 1 1 6 4 1 15 1 12 1 1 1
Underground cables	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1 1 1 1 1 1 1 1 1 1 1
Telecommunications tower	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	1	2	3	3	3	1	1	1	1	1	1	1 1 1 6 1 1 6 1 6 9 1 1 1
Pole mounted CCTV camera	1	1	1	1	1	1	2	3	2	2	2	1	3	3	1	1	2	3	3	1	2	2	2	2	4	3	1 1 1 6 4 2 9 1 6 3 4 4 12

Fig. 4. Sensitivity, exposure, and vulnerabilities in telematics
Source: Infraestruturas de Portugal

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