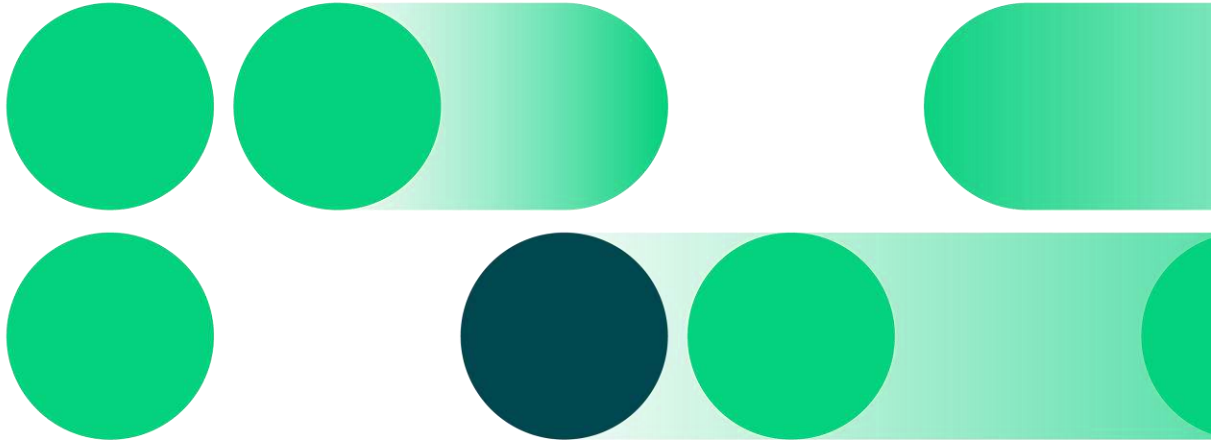
IVM Workshop 2024

Workshop #4 – Fire management & compatible uses

Vegetation Management REN's Strategy



22nd November| Ermesinde, Portugal

DIREÇÃO / ÁREA

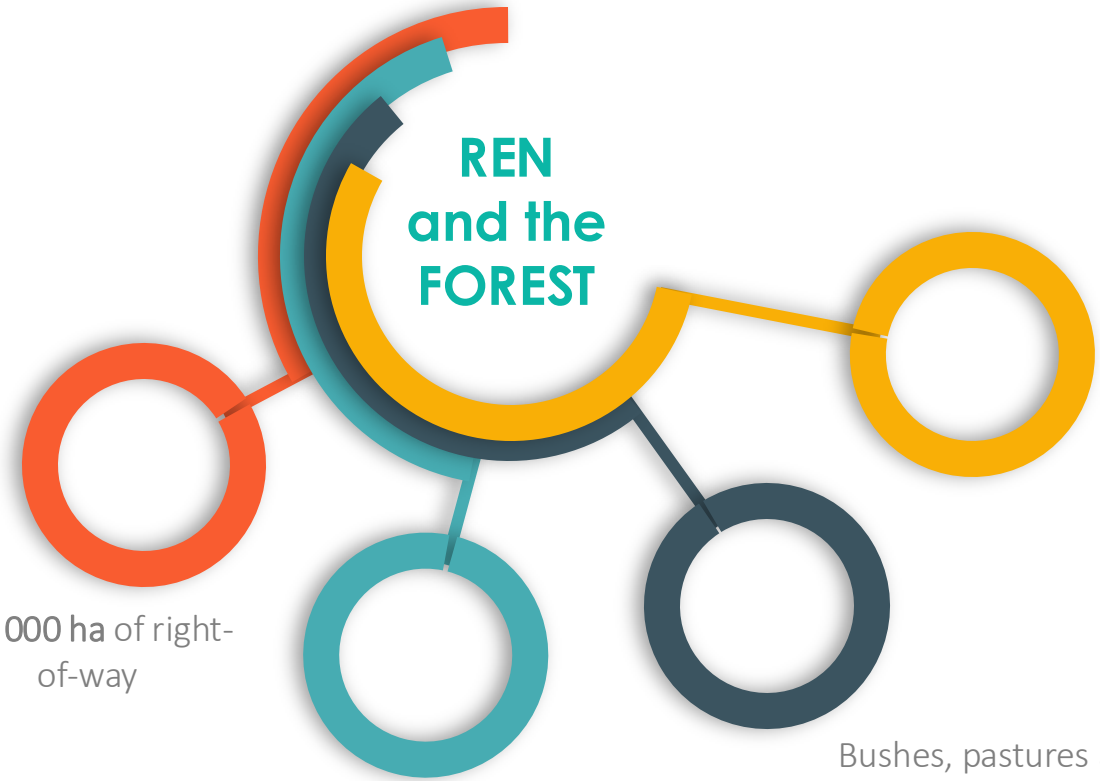
Data:	22/11/2024	**Proprietário:**	OGOP-RSS
Versão:	v1.0	**Aprovado por:**	
Classificação:	Público	**Lista de distribuição:**	

01

REN AND TERRITORY

Vegetation Management REN's Strategy

REN and TERRITORY



>35 000 ha of right-of-way

23 500 ha (+66%) are located in **forest areas**

Eucalyptus trees represent 27% of **land occupation**, followed by cork oaks with 23% and maritime pines with 18%.

Bushes, pastures and forest are the dominant **land use**, occupying about 37% and 27%, respectively.

Vegetation Management REN's Strategy

REN and TERRITORY

REN Right of Way in Forest Areas

23 500 ha

Vegetation Management REN's Strategy

IVM STRATEGIC OBJECTIVES

SUSTAINABILITY

Integration of REN's NATURAL CAPITAL, based on the principle of creating shared value and promoting Ecosystem Services aligned with REN's strategic SDGs

SOCIETY

Compatibility with **Local Communities** and Environment

SECURITY

Adaptation of energy infrastructure to **climate change**, namely to extreme weather phenomena

LEGISLATION

DL 82/2021
Infrastructure protection against rural fires (SGIFR)

LEGISLATION

DR 1/1992
Guarantee of Electricity Transmission Network security conditions

LEGISLATION

DL 11/1994
Guarantee of Gas Transport Network security conditions

COSTS

Cost Reduction through Increased Intervention Cycles (≥ 3 years)

Vegetation Management REN's Strategy

REN and TERRITORY

ROW Reconversion

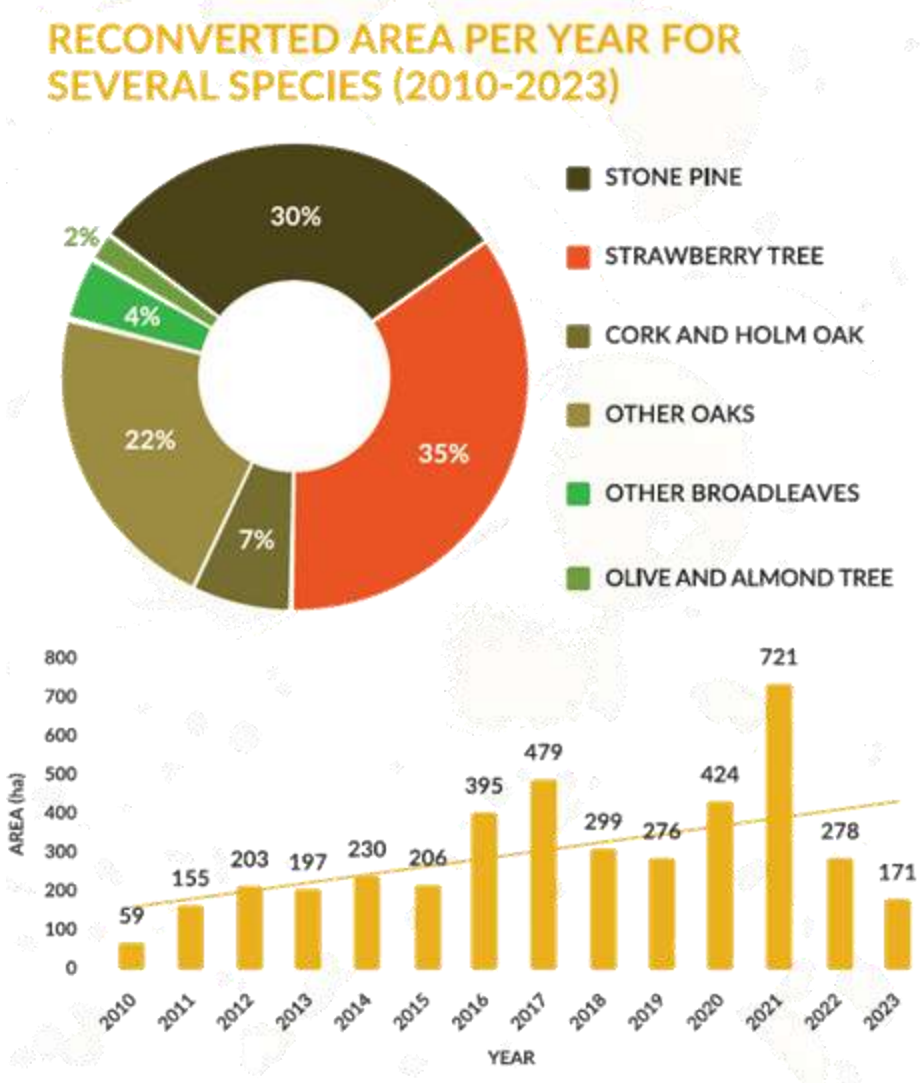
- ✓ Since 2010, REN has converted **over 4000 ha** of ROW from fast-growing species into **compatible uses**, that promote **social, economical and environmental values**.

Benefits

- ✓ Enhancing the **value of the territory**
- ✓ Promoting **well-being and income** for landowners and local communities
- ✓ **Ecosystem services** provided by the new plantations

Reconversion Roadmap

- ✓ **2010 - 2014:** Stone pine in coastal areas
- ✓ **2015-2017:** Oaks and chestnuts in Northern Portugal
- ✓ **Since 2018:** Strawberry tree, for its hardiness and economic value



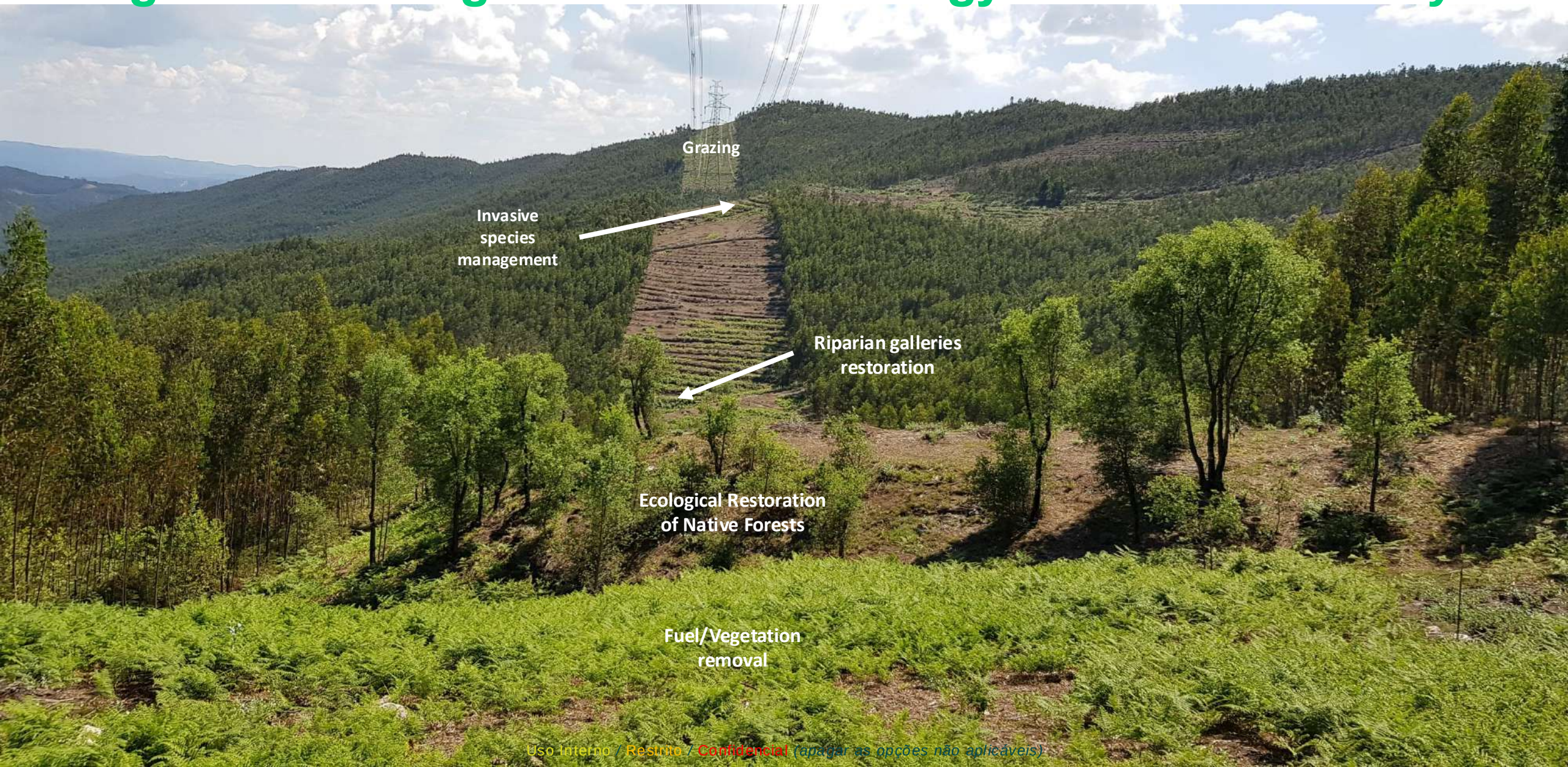
Vegetation Management REN's Strategy

REN and TERRITORY

Vegetation Management REN's Strategy

REN and TERRITORY

Vegetation Management REN's Strategy - Multifunctionality



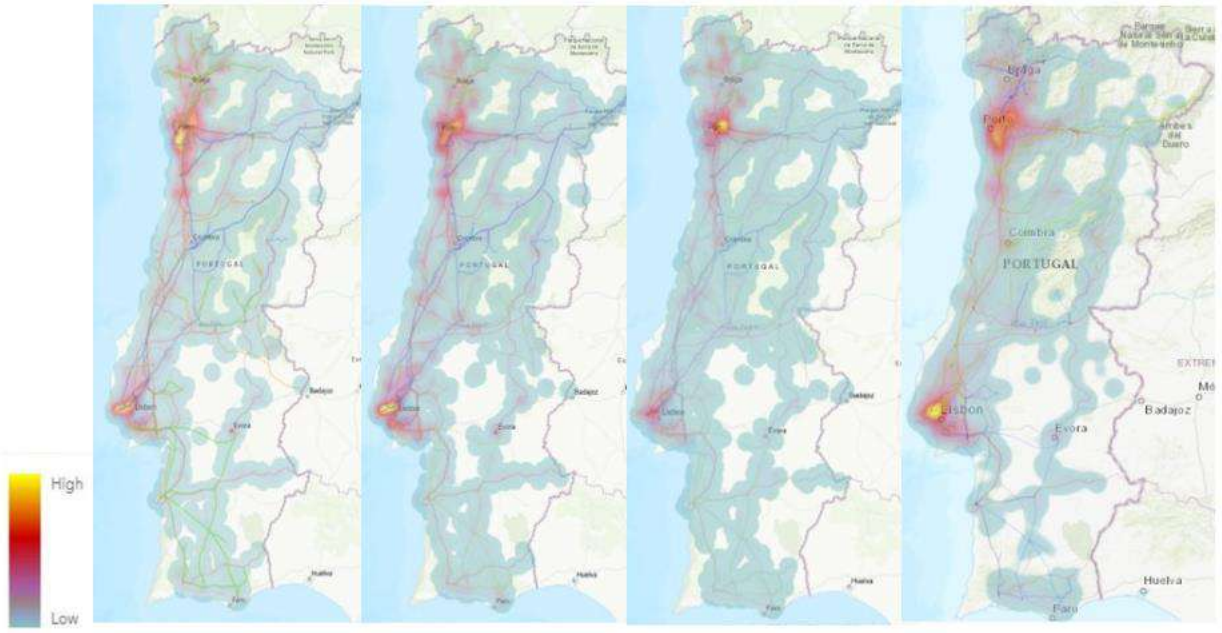
02

INNOVATION - INCREASING RESILIENCE OF ASSETS FACING THE RISK OF WILDFIRES

Vegetation Management REN's Strategy

Increasing Resilience of Assets Facing the Risk of Wildfires

- Average of 5000 fires detected per year near REN infrastructures
- Almost all network is affected by wildfires



Portugal ≈ 92 000 km²

Forest areas ≈ 62 000 km²

Burned area 1980-2021 ≈ 49 000 km²

Vegetation Management REN's Strategy

Increasing Resilience of Assets Facing the Risk of Wildfires

REN Forest Fire Alert (2017)

Notification on dashboard of wildfires detected **< 5km REN Infrastructures**

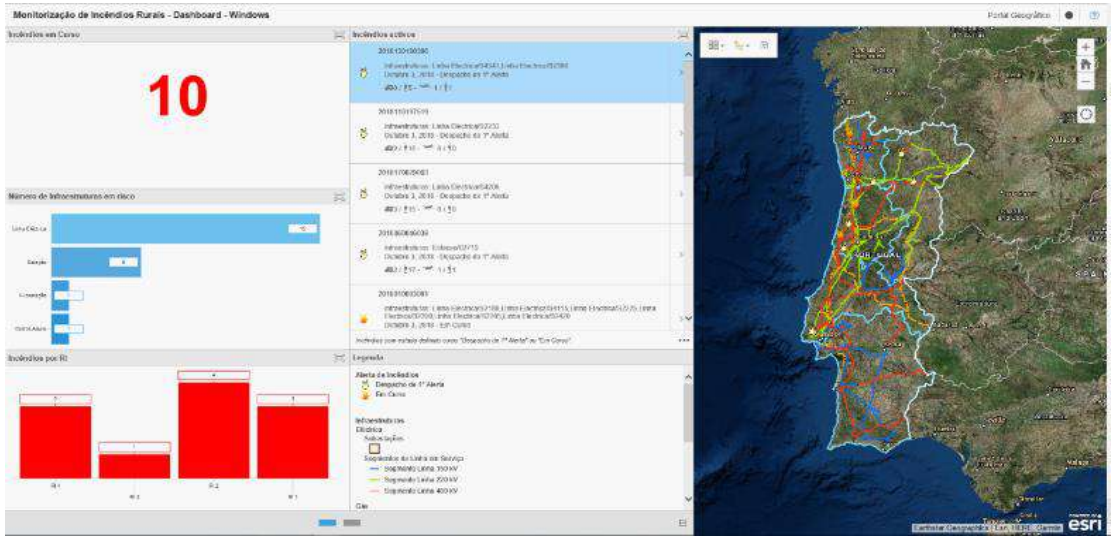
SMS of wildfires detected **< 2km REN Infrastructures**

The Problem:

- Focus on the **point of ignition**
- No information on **where and when it is going to impact** the infrastructure
- **High volume of alerts**

Incoming SMS (text message) when at less than 2km

Forest wildfires dashboard < 5 km critical infrastructures

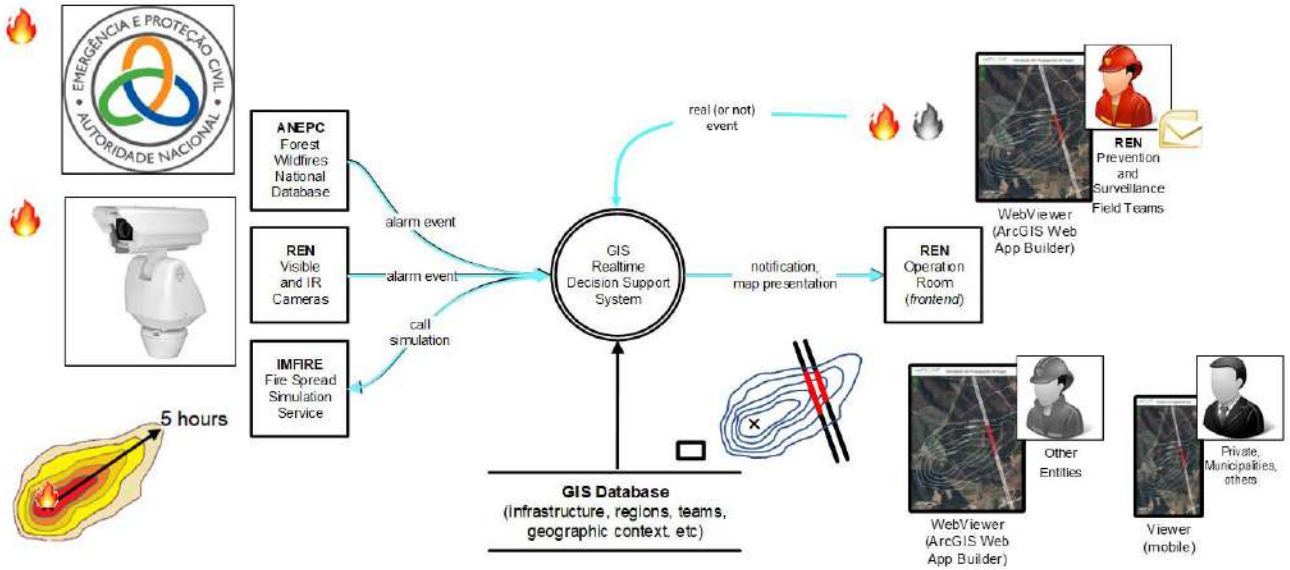


Vegetation Management REN's Strategy

Increasing Resilience of Assets Facing the Risk of Wildfires

rePLANT Project (2021-2023)

- ✓ **Eight infrastructure monitoring and fire detection systems** were installed
- ✓ A **Decision Support System was developed** to anticipate when and where wildfires may impact the infrastructures

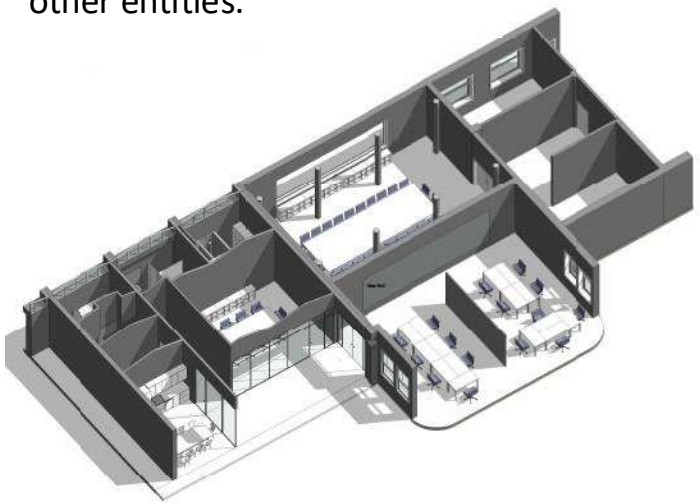


Vegetation Management REN's Strategy

Increasing Resilience of Assets Facing the Risk of Wildfires

transForm Agenda - P1.6. CENTRODEC (2023-2025)

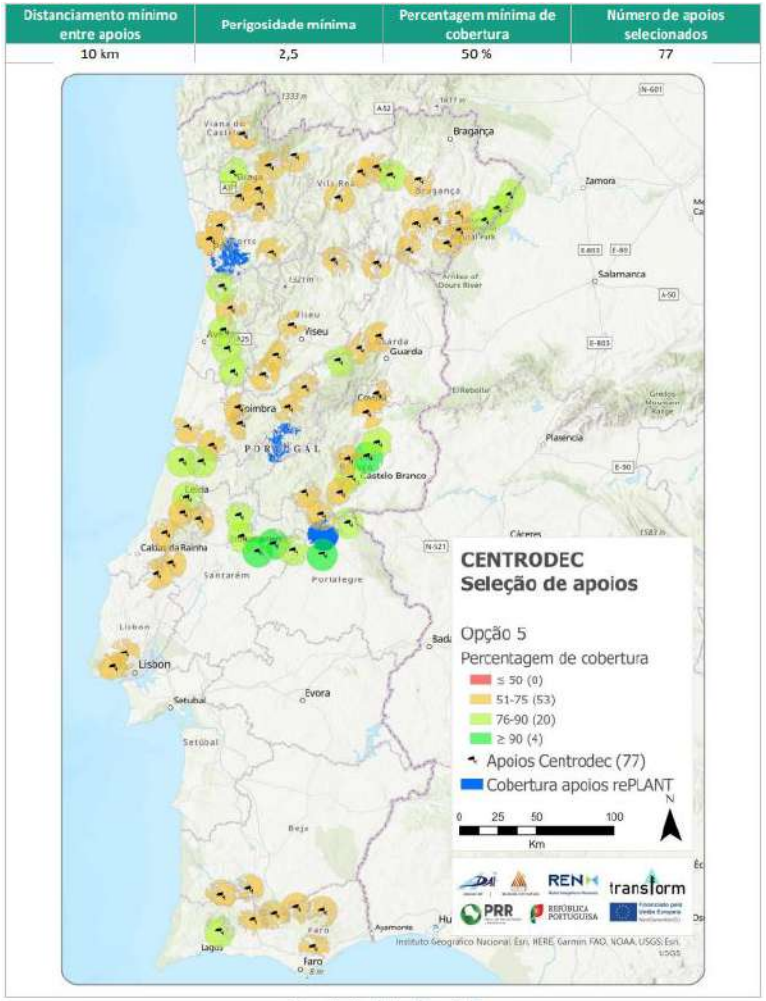
- ✓ Install **80 infrastructure monitoring and fire detection systems**
- ✓ Further develop the **Decision Support System** to anticipate other risks and impacts for asset management and protection
- ✓ Create a **Business Model to provide services to other entities**
- ✓ Create a **Decision Support Centre** to manage and provide Decision Support Systems as a service to REN and other entities.



Natureye

Fireye Watereye Stormeye Safeye

Distanciamento mínimo entre apoios	Perigosidade mínima	Percentagem mínima de cobertura	Número de apoios selecionados
10 km	2,5	50 %	77



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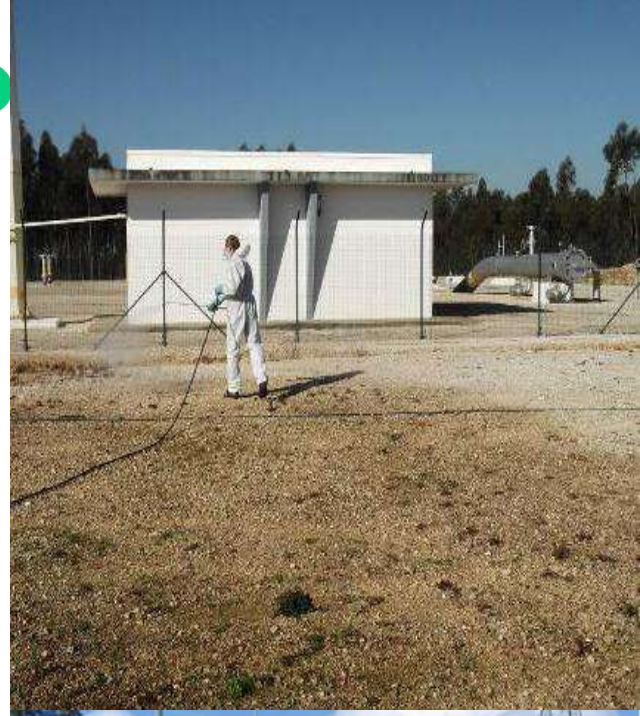
04

INNOVATION - ROBOT FOR IVM IN REN'S STATIONS AND SUBSTATIONS

Vegetation Management REN's Strategy

Robot for IVM in REN's Stations and Substations

- Point of departure – IVM within the installations
  - IVM using manual means
  - Cutting or plucking + herbicide
- Objectives
  - Reduce human exposure to herbicides and risk situations
  - Increase Operacional efficiency
- Solution
  - Autonomous Robot with cutting and spraying functionalities



Vegetation Management REN's Strategy

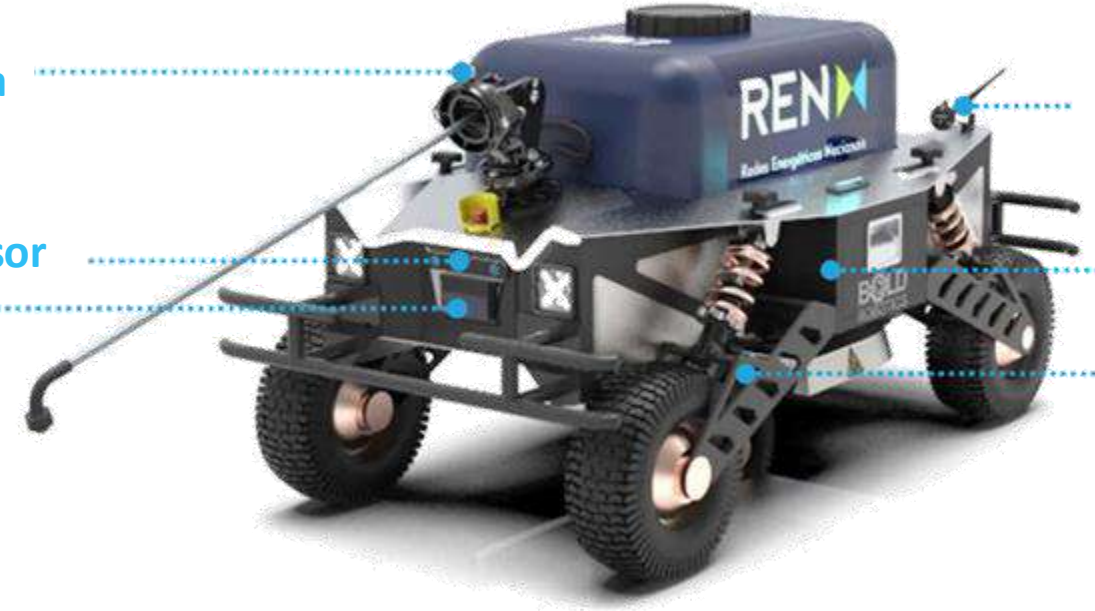
Robot for IVM in REN's Stations and Substations

- Timeline:
  - Pitch at REN's INNOVATION LEADERS 2022
  - Specifications defined in 2023
  - Development started in April 2024
- Next steps
  - First operational tests 27th November
  - Deployment in October 2025

Vegetation Management REN's Strategy

Robot for IVM in REN's Stations and Substations

BOLD ROBOTICS



Frontal Pulverization Camera

Global Navigation Satellite System

RGB Sensor

LiDAR Sensor

Central Processing Unit

Inertial Measurement Unit

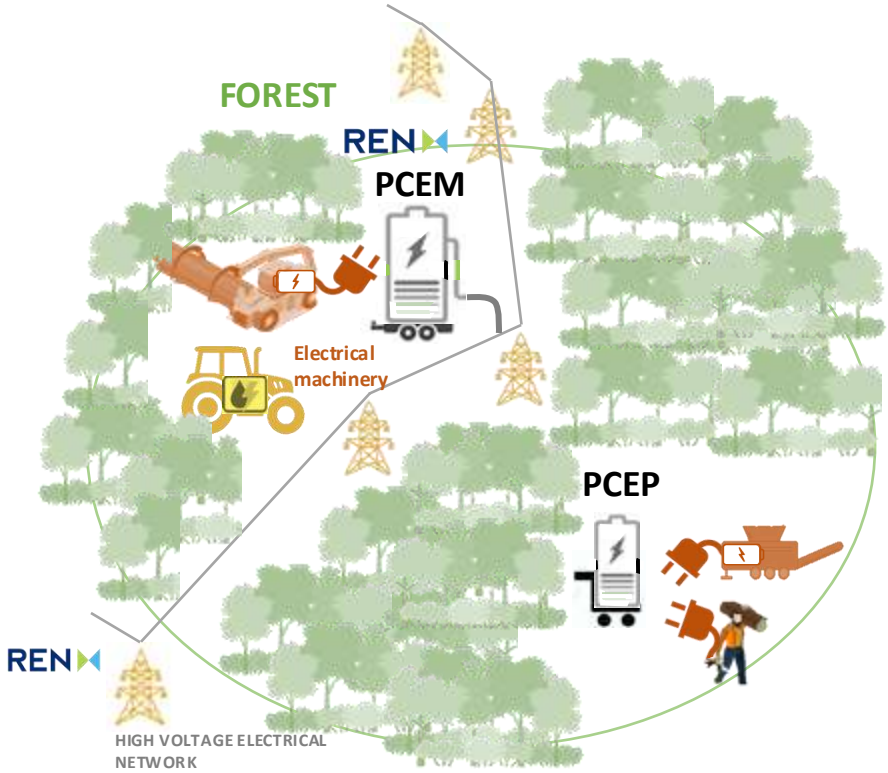
05

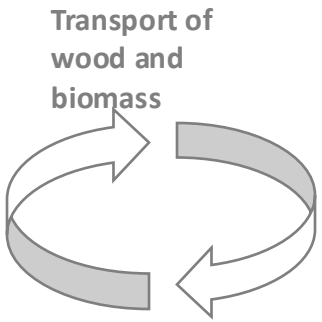
INNOVATION - BOOST THE ADOPTION OF ELECTRIC MOTORIZATION IN THE FORESTRY SECTOR

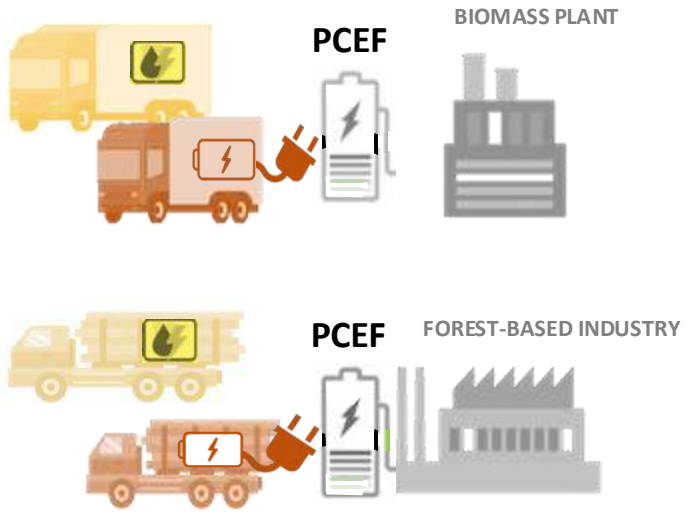
Vegetation Management REN's Strategy

Boost the Adoption of Electric Motorization in the Forestry Sector

Innovative solution for electric mobility created and developed by REN that enables charging electric vehicles directly from Very-High-Voltage transmission lines







66% of the Transmission Grid is located in forest

Vegetation Management REN's Strategy

Boost the Adoption of Electric Motorization in the Forestry Sector

PCEM

PCEF

PCEP

Charging Stations:

PCEM. Mobile electric charging station for heavy machinery
PCEF. Fixed electric charging station for forestry trucks
PCEP. Portable Electric Equipment Charging Station

SPEED-E FAST POWER

altriflorestal

unimadeiras A FLORESTA É A NOSSA VIDA

transform

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05

INNOVATION – OPTIVEG SUSTAINABLE OPTIMIZATION OF FOREST OPERATIONS

Vegetation Management REN's Strategy

OPTIVEG Sustainable Optimization Of Forest Operations

- ✓ **Increase the productivity** of vegetation management operations by **reducing costs** and contributing to the achievement of strategic goals
- ✓ **Reduce the environmental impact** of operations during the season and greenhouse gas (GHG) emissions
- ✓ Support compliance with **safety distances** in accordance with **RSLEAT** (Regulatory Decree No. 1/92, February 18) and **SGIFR** (Decree-Law No. 82/2021, October 13)
- ✓ Develop the **OPTIVEG Platform** – featuring a mathematical model to support operational planning – to allocate the correct machine to the appropriate station
- ✓ Develop an **Augmented Reality** tool to assist operations

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Vegetation Management REN's Strategy

OPTIVEG Sustainable Optimization Of Forest Operations

Integration into REN's GIS – OPTIVEG Platform

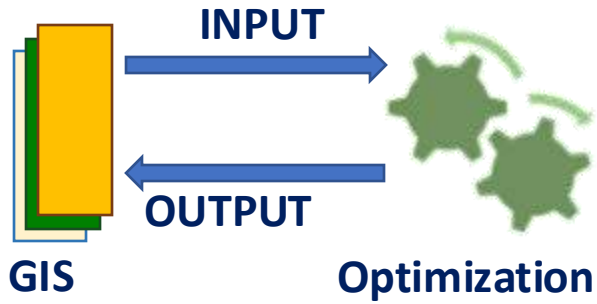
1. Selection of polygon/area to be intervened – characterization of the selected area

- Collection of information about the station from cartographic database

2. Selection of available equipment

3. Sending this information as input to the OPTIVEG model

4. Receiving output from the model – a table with productivity, time, emissions, etc., associated with different equipment in the selected situation



Augmented Reality tool to support field operations

Support the execution and validation of integrated Vegetation Management actions in REN's Right-of-Way

✓Field representation of the ROW boundaries

✓Representation of critical points identified by LiDAR scanning

✓Display of cables under maximum load and safety distance buffers

✓Compatibility with REN and service providers tools

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OBRIGADO

Thank you