

3rd ASECAP SUSTAINABILITY FORUM

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THE ROAD MAP TO SUSTAINABLE ROAD OPERATIONS

The Approach Of Greek Motorways

Dimitrios Gatsonis CEO, Aegean Motorway S.A. Vice President, Hellastron Head of Hellastron's Sustainability Taskforce



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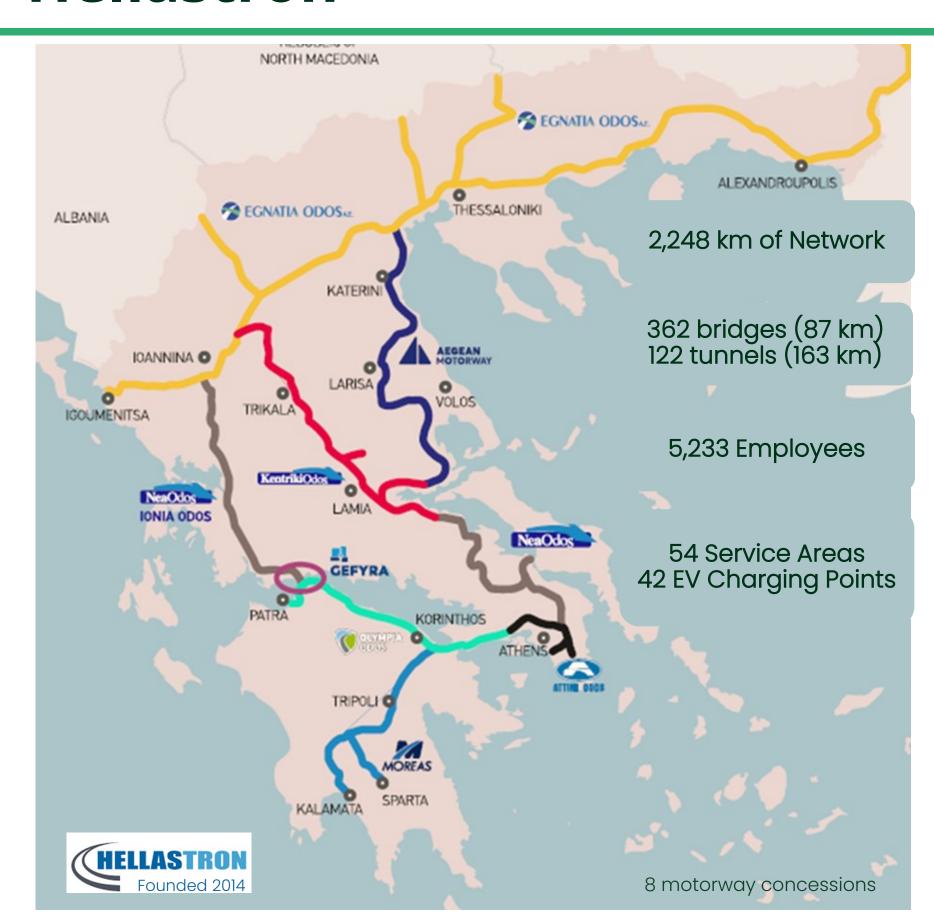


Sustainable use & Protection of Water & Marine resources

Project Examples

Hellastron

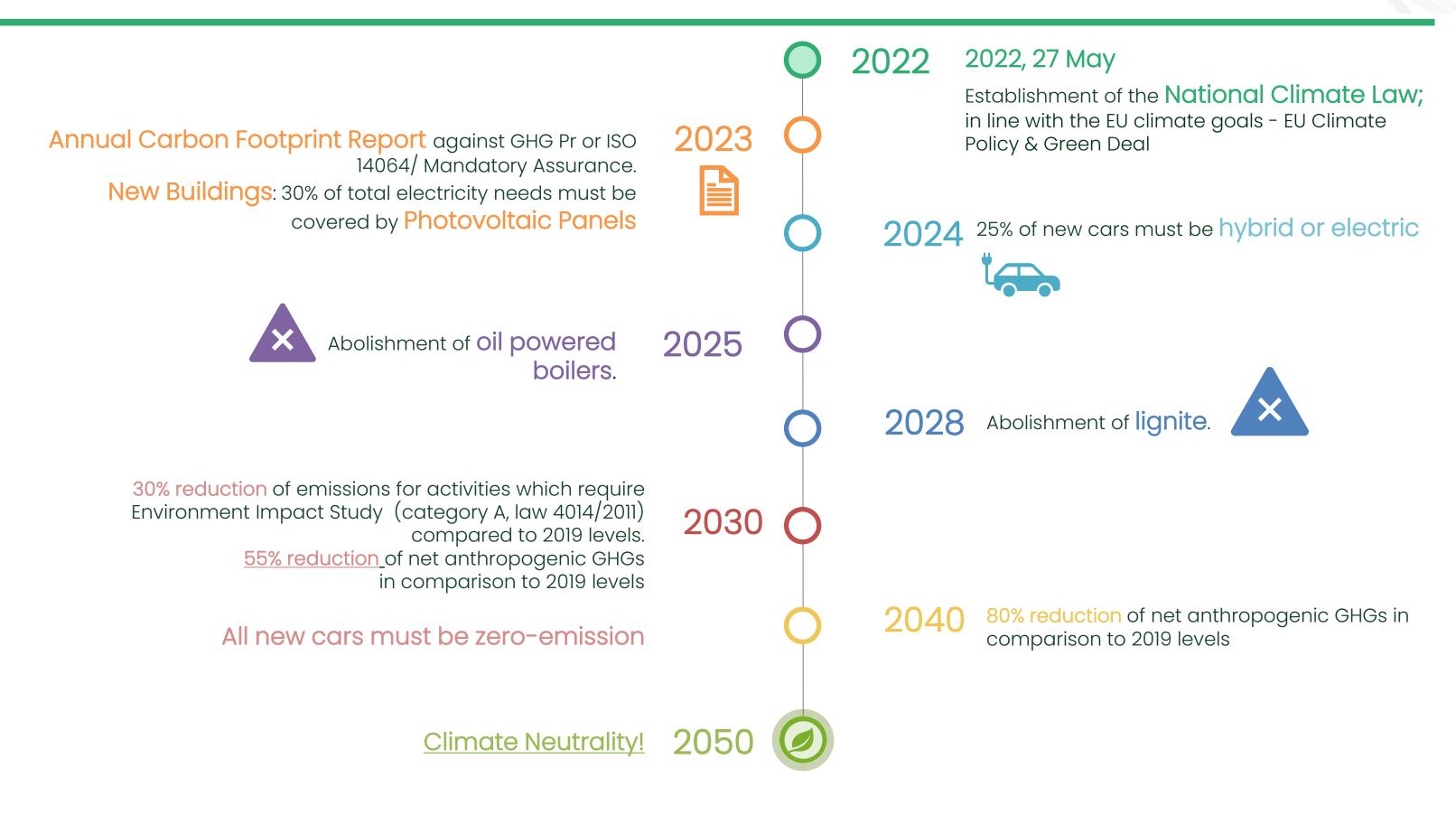






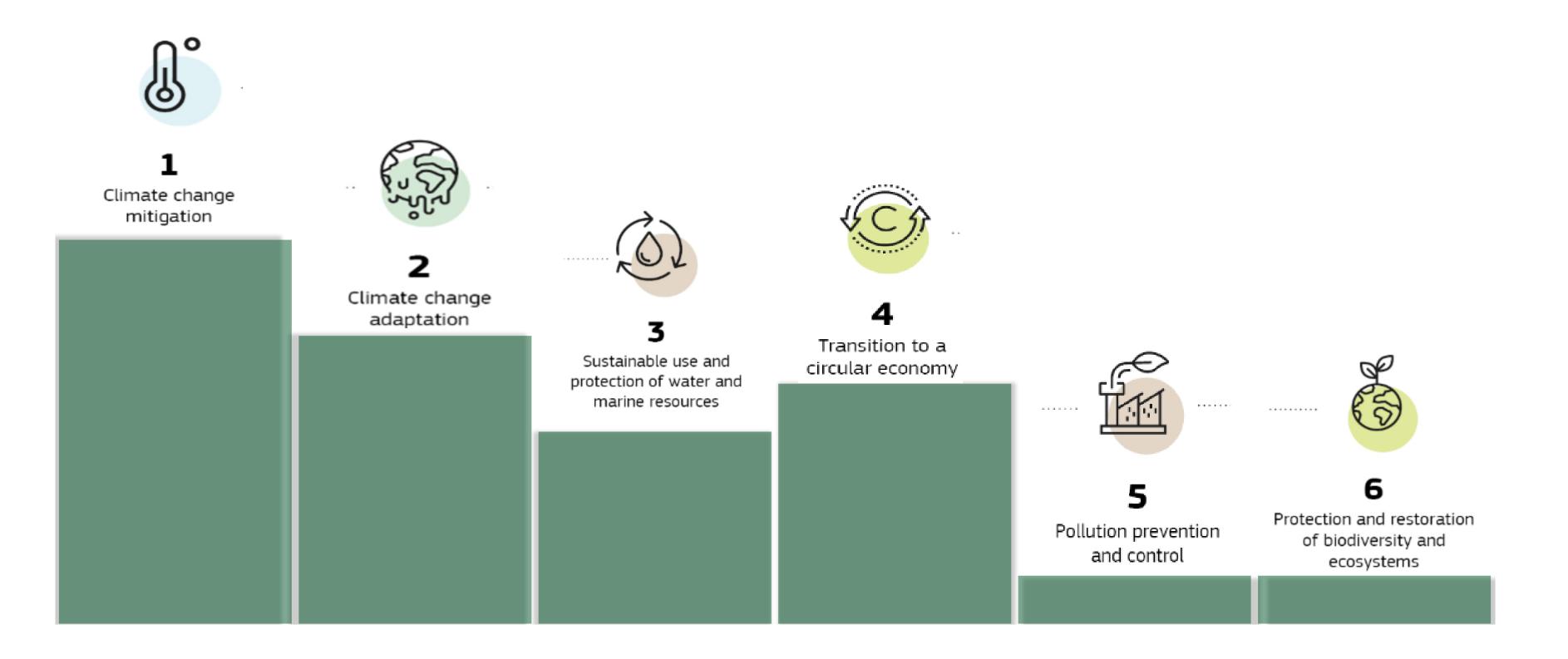
National Climate Law





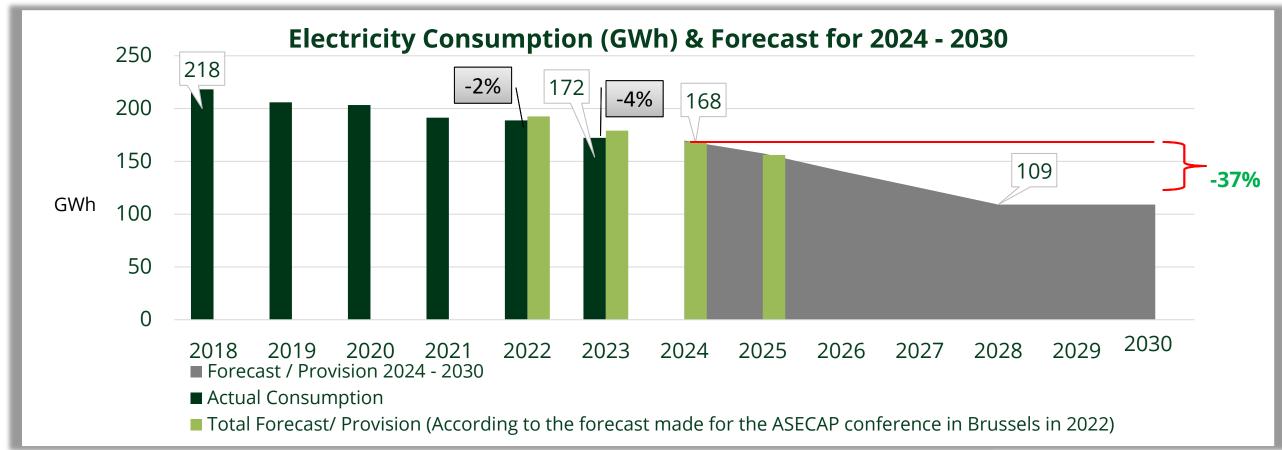
Taxonomy Goals: Priorities of Hellastron Members

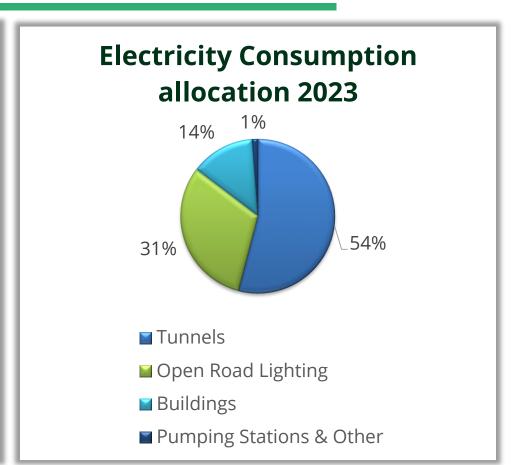


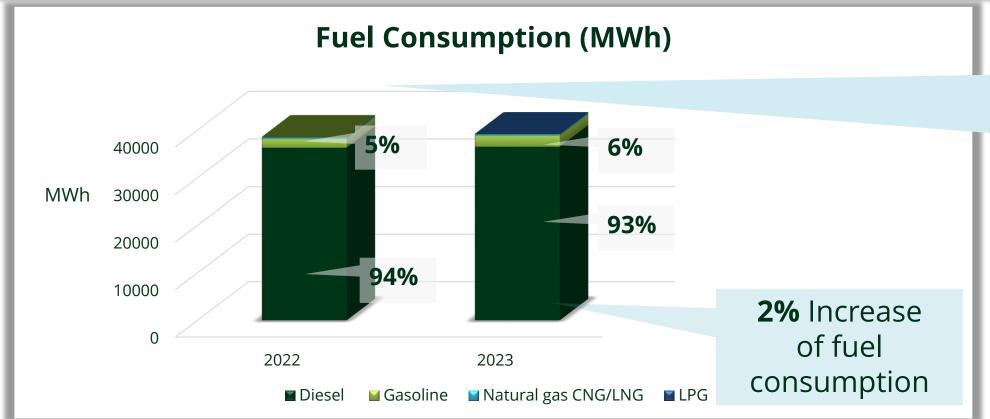


CLIMATE CHANGE Mitigation: Energy Management







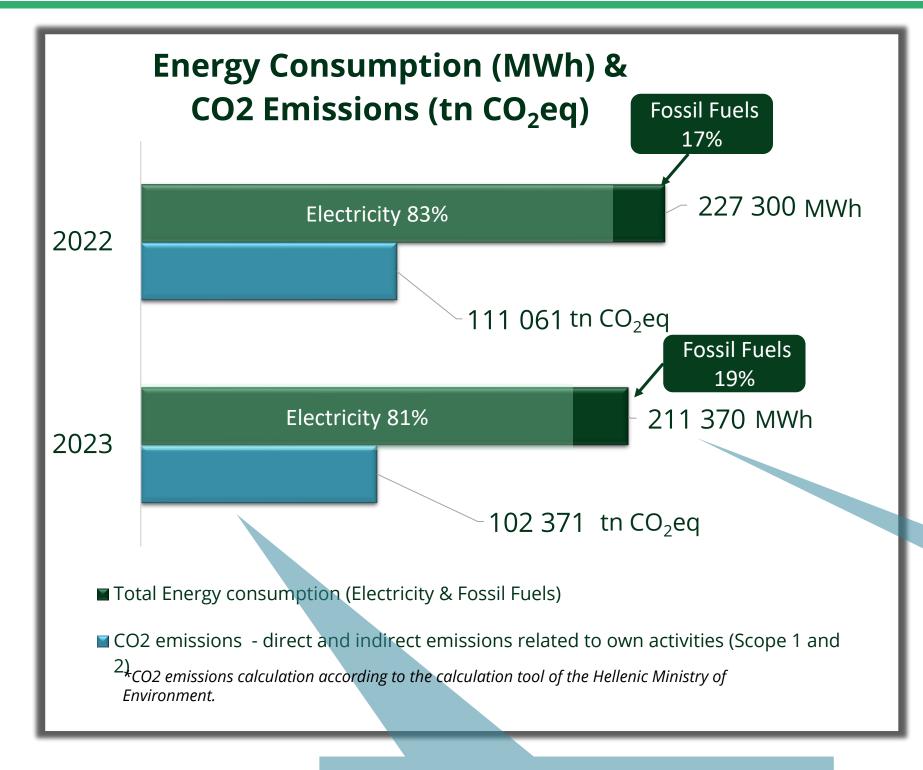


Annual fuel consumption for Hellenic Motorways' Fleet equals to **39 GWh**



CLIMATE CHANGE Mitigation: CO₂ Emissions





Electrical
Consumption
of Greek Motorway's
accounts for 90%
of greenhouse
emissions

Fleet of Greek
Motorway's
produce 10% of
greenhouse
emissions

7% Reduction of Energy Consumption year on year

8% Reduction of direct and indirect emissions related to own activities (Scope 1 and 2)



CLIMATE CHANGE Mitigation: Project Examples



LED Lighting

Lighting upgrade:

Open Road – completed in 2019

Tunnels – completed in 2023



Toll Stations – completed early 2024

Lighting upgrade in progress (Tunnels, Open Road)

NeaOdos





Adaptive lighting system

Smart street lighting system

that adapts with traffic data pattern



Smart Lighting Management Software

that adapts with real traffic data







CLIMATE CHANGE Mitigation: Project Examples



Solar Energy Production



17 Solar Plants to cover > 80% of energy needs



The first Hybrid Electric Car Charging Station at Malakasa MSS:

fast **charging directly from solar panels installed** on the parking canopy (250 KW)



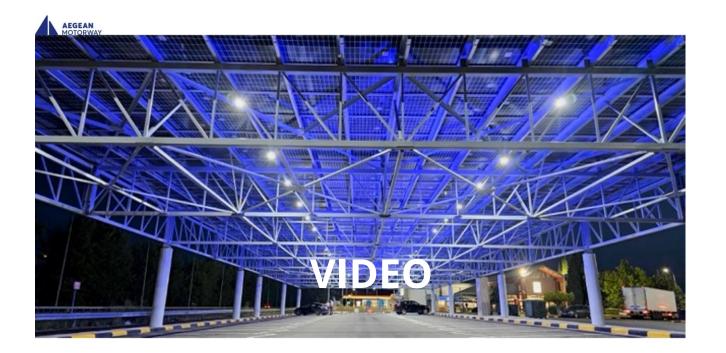
Green energy & EV charging





EV chargers at Korinos MSS:

fast **charging directly from solar panels installed** on the parking canopy (260 KW)





CLIMATE CHANGE Mitigation: Project Examples



MSS Energy Upgrade

Rehabilitation of Korinos MSS

Upgrade of the energy class,

Energy class C

EP ≤ 0,33 R_R

A+

0,33 R_R < EP ≤ 0,50 R_R

A

A

0,50 R_R < EP ≤ 0,75 R_R

B+

- building rehabilitation works
- Installation of **114 solar panels** on the roofs

Additionally,

Installation of LED in the MSS parking areas (outer environment improvement works)



Energy Management Software (EMS)

EMS in operation since **2023**



Monitoring (real time) of > 90 electricity consumption meters and 22 water supply points

Fleet modernization and electrification

Pilot use of small vans:

- 2 electric vans since 2021 (Maintenance)
- 8 electric vehicles since 2023 (Toll Department), investing in electric and hybrid cars for staff and constantly monitoring

developments in the field of EV in order to further expand their use in the future





"SELLAS": Pilot – Research Project

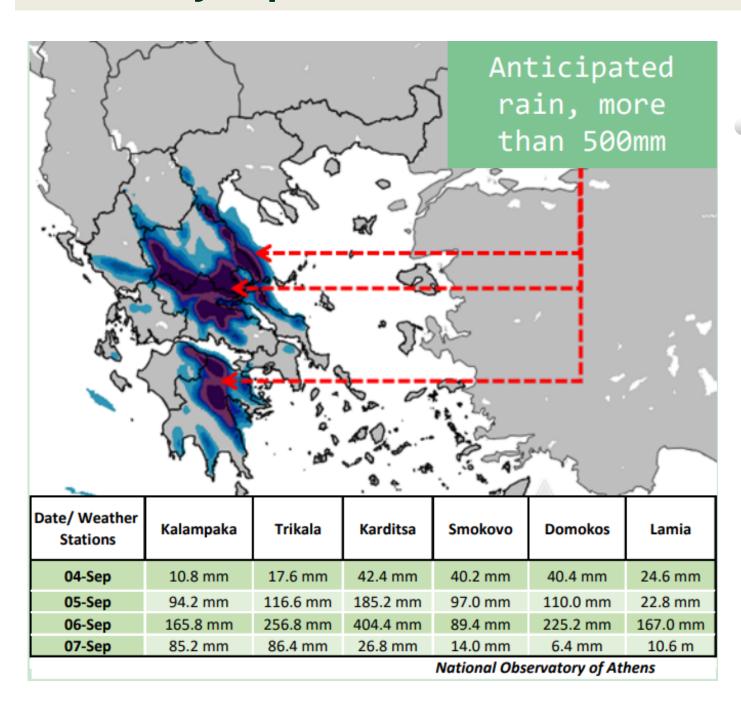
Autonomous system for the non-intermittent generation and storage of electricity using photovoltaic on motorways

The SELLAS photovoltaic technology will be able to provide power throughout the whole day, as they will utilize diffused night light from sources such as cars and highway lighting infrastructure.





Motorways operation under extreme weather disturbances



4-7 September 2023 severe rainfall on Thessaly, Greece Local weather stations recorded 200mm to 1100mm of rainfall

Critical damages on infrastructures, buildings, agriculture

Aegean and E65 Motorways faced challenges in operation and recovery







Motorway operation under extreme weather conditions



Impact:

- Streams overflowed on nine (9) sections along the motorway
- Damages to motorway fencing, guardrails, slopes & hard shoulders
- Clogged drainage pipes, culverts
- Functionality problems across all toll stations

Actions:

- Gradual traffic deviations
- Sectional motorway cleaning and restoring









Motorways operation under extreme weather disturbances



Phase A – Sudden & Extreme heavy rain (2 days)

Impact:

- Over a length of 100 km
- Severe damage on embankments and pavement
- Water inflow in Tunnel T2

Actions:

- Traffic management measures for traffic deviation
- Visual inspection of all assets

Infrastructure adaptation & resilience



Phase B – Flooding of the Motorway

Gradual rise of water level (3 consecutive days)

- An section of 5 km main road was severely affected
- All traffic was suspended for more than a week. The necessary diversion connecting Athens and Thessaloniki increased travel time by 25%







Motorways operation under extreme weather conditions



Phase C – Recovery of the Road The 5km section was fully reopened to traffic (incl. HV) after two weeks

In order to reinstate the operational condition of the motorway, a number of action was necessary:

- √ Heavy cleaning of the surface
- ✓ Visual inspection of affected assets
- ✓ Grip testing of pavement (with British Pendulum and Micro Griptester devices)
- ✓ Surface smoothness/evenness checks (with a special vehicle carrying special electronic equipment)
- ✓ Paement bearing capacity tests (with the Benkelman beam test)
- √ Geotechnical tests (boreholes and laboratory tests)





Ensuring maximum safety for drivers
Blueprint for checking operational status of the motorway
before and after extreme weather phenomena

Sustainable use & Protection of WATER & MARINE RESOURCES: (HELLASTRON





Project Example



- Tunnels Tanks collecting tunnel water outflows

Open motorway -Rainwater outflow tanks









POLLUTION Prevention & Control: Management of Environmental Incidents



Removal of Waste and other types of Pollutants

Hazardous waste produced following motorway incidents (e.g. fire incidents involving trucks loaded with electrical Bicycles and electrical Scooters) had to be managed by specialized contractors

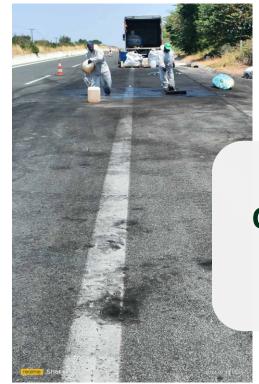




Stage 1
Removal of the main volume of the burnt materials



certified big Bags



Stage 2
Clean-up of the contaminated area

Stage 4
Temporary storage of hazardous waste at licensed facilities until transferred to a licensed facility for further treatment/disposal



Protection & Restoration of BIODIVERSITY and ECOSYSTEMS: Project Examples



Life Safe Crossing



The main actions are:

Monitoring

Monitoring activities are divided in ex ante monitoring in order to estimate the impact of road mortality on the target species before the start of the project, and ex post monitoring in order to evaluate the efficacy of concrete conservation actions.

Prevention of Animal-Vehicle Collisions

- ➤ Installation of 27 AVC Prevention Systems
- ➤ Installation of active warning reflectors on 34 km of roads in the project area
- ➤ Readaptation of round 100 underpasses to favor animal movements
- Management of the vegetation on the road sides in order to reduce Animal vehicle collisions
- ➤ Elaboration and installation of specific road panels, designed trough the application of the neuromarketing technique, to raise awareness of drivers about the risk of collision with the target species.

Dissemination and public awareness activities











Conclusions & Outlook



- Reduction of electricity consumption and production of Green energy remains first priority as it has the biggest impact on greenhouse emissions
- > 55% reduction of emissions will need involvement of green energy production
- > Electrification of O&M fleet remains a challenge
- Waste Management and recycling has room for improvement on the way to a Circular Economy
- Water resource management will be of vital importance in the near future for Greece





THANK YOU

Dimitrios Gatsonis, CEO
Aegean Motorway S.A.
Vice President Hellastron
Head of Sustainability Taskforce
41500 Moschochori, Larissa, Greece
Tel: +30 2414 401 000
Mob: + 30 698333 4006
Email: dgatsonis@aegeanmotorway.gr

