



Slovenske železnice

# IMPLEMENTATION AND EXPERIENCE WITH ISO 50001 IN RAILWAY GROUP SŽ- Slovenske železnice

Tomaž Štor energy efficiency manager - EUREM

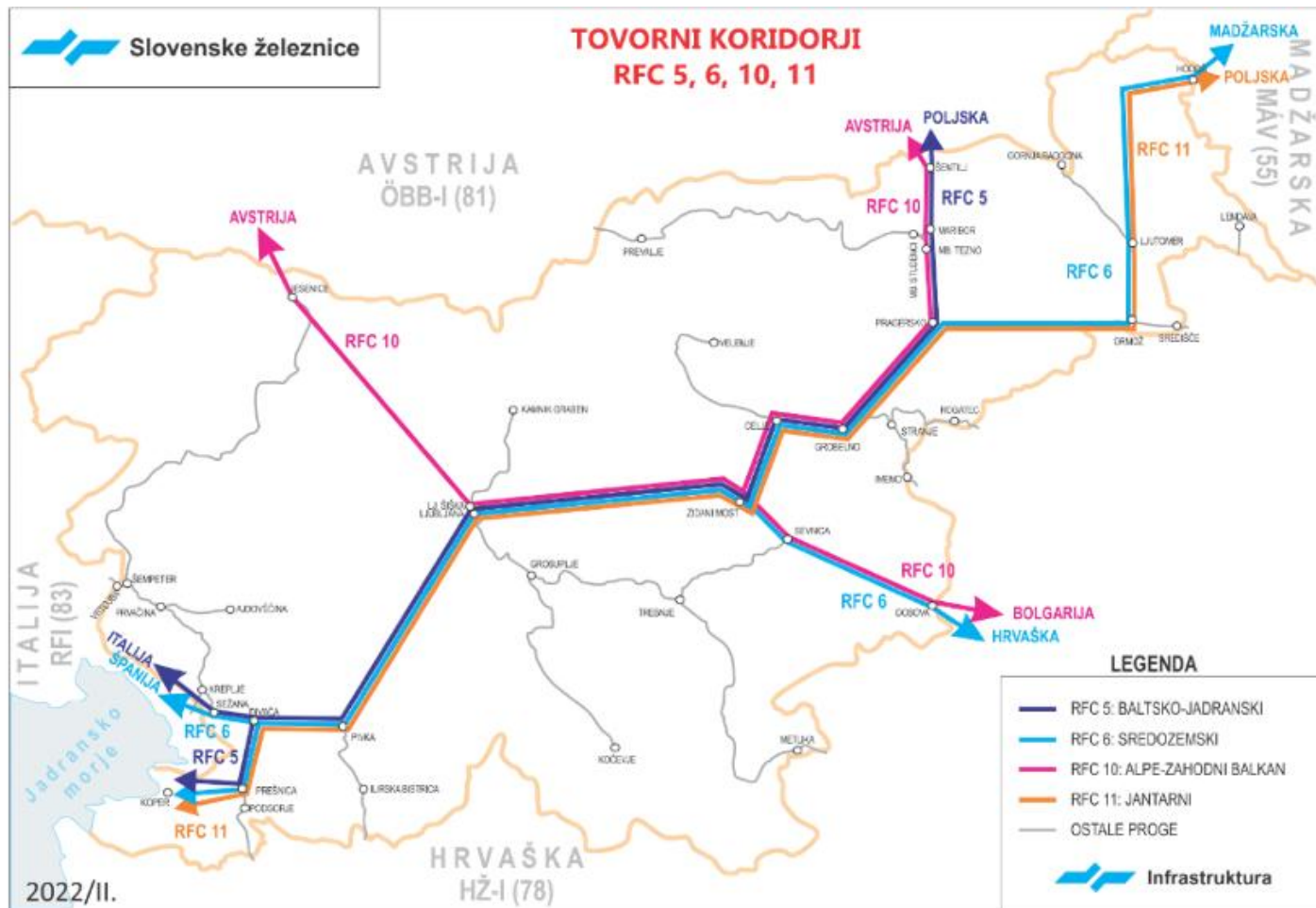
# SŽ group

- Presentation of the Group SŽ
- Legislation and decision for ISO 50001
- The most important requirements of ISO 50001
- Important trainings
- How 50001 lives in the company Energy efficiency curves, achievements What we have done in the company and what we are planning to do in next years

Slovenia is located in the southern part of Central Europe between Austria, Croatia, Italy and Hungary.



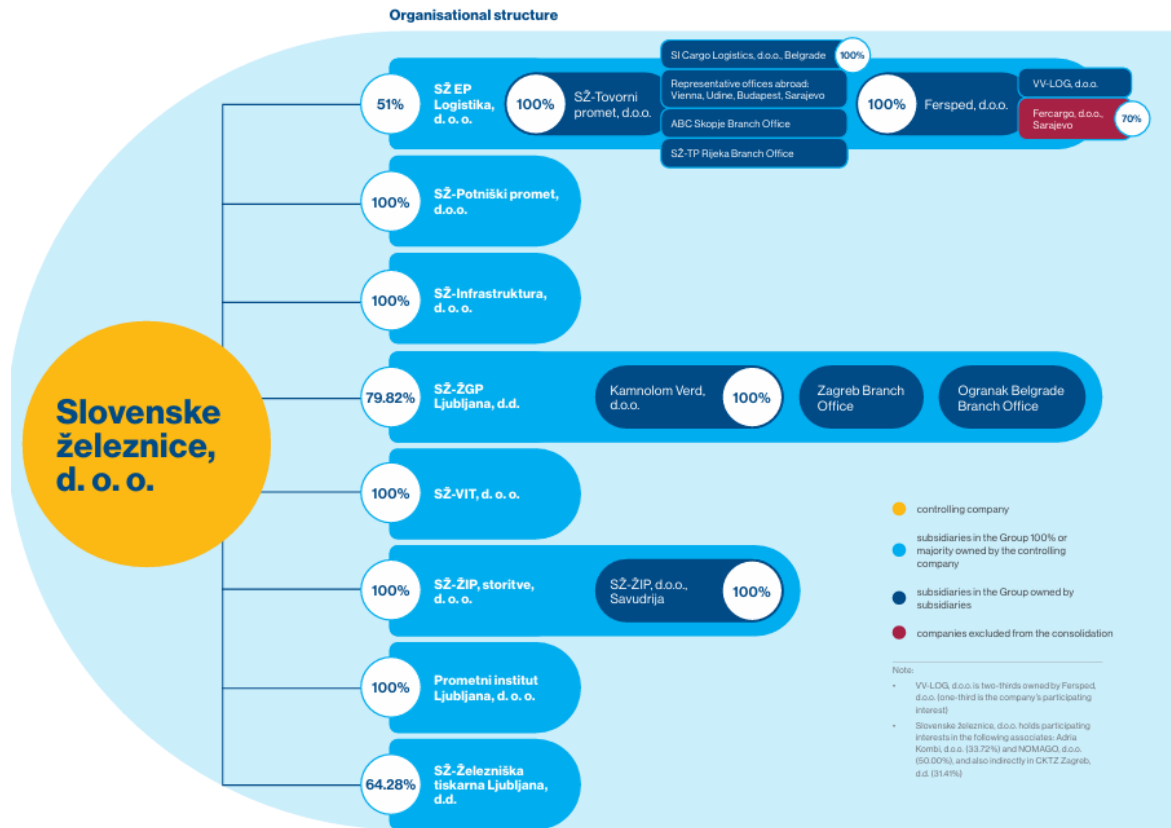
The port of Koper has access to the sea and is an important stakeholder for SŽ



# Presentation of the joint SŽ

State owned company

- 126 railway stations
- 90 railway stops
- 7100 employees
- 1200 kilometers of railway tracks
- 600 kilometers of electrified railway tracks
- 80 locomotives
- 130 passenger train sets
- 700 buses
- 5 workshops



# Why 50001 in the Railway company

## Why

Already in 2018, the country of Slovenia included in legislation that all large companies in Slovenia are required to conduct energy audits of the company every 4 years. Or to implement ISO 50001. In 2018, Slovenske železnice decided to implement ISO 50001 across all companies in the Group.

Every 3 years we must report to the state authority (Energy Agency) whether we have renewed the ISO 50001 certificate to be entitled to carry out periodic energy external audits (3 years)

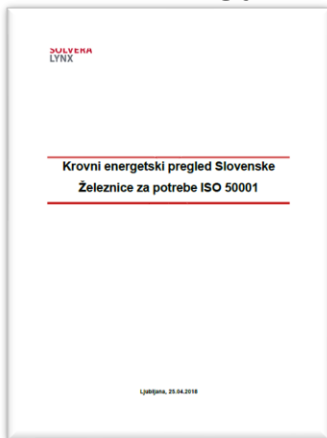
## Purpose

Decision-makers have decided that in the future, Systematic control over energy use and energy management takeover will be necessary. First through ISO 50001, then through energy software.

# The most important requirements from ISO 50001 for implementing the standard in a company

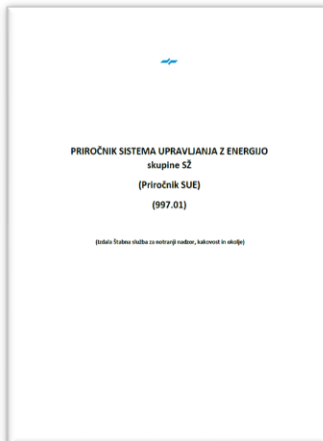
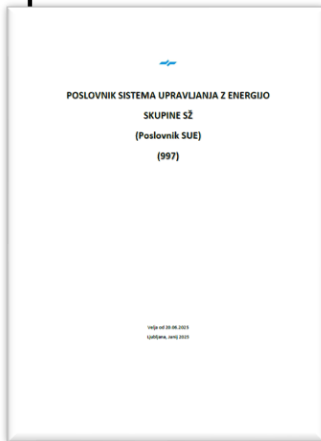
- 2018 First Overall Energy Review
- Rules and Handbook for the Operation of the Energy Management Group
- Energy Policy
- Scope and Boundaries
- KPI Indicators
- Action Plans
- Monitoring Legislation
- Education, Training, Employee Awareness
- Management Review (every year - continuity) (internal and external audit , internal and external energy review)

## - Overall energy review



The overall energy review in 2018 provided guidelines on which energy users are important and need to be monitored. Standard 50001 requires the company to monitor energy efficiency of at least 80% of all energy consumption in the company

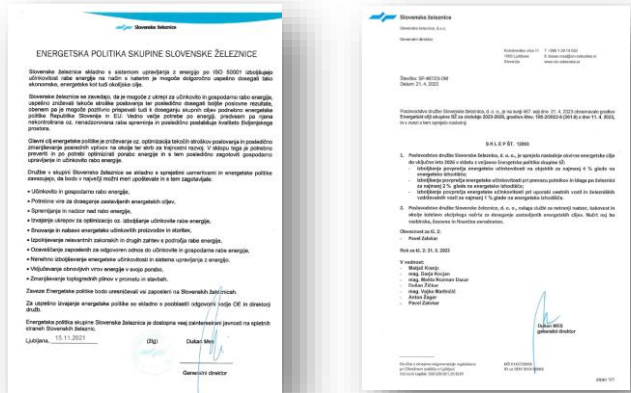
## - Rules of procedure and handbook for the operation of the energy management group



Through the rules of procedure and the manual, the operation of ISO 50001 in the companies of the SŽ Group has been defined. The mentioned documents are fundamental documents that commit the transfer of requirements from the ISO 50001 standard to the SŽ Group.



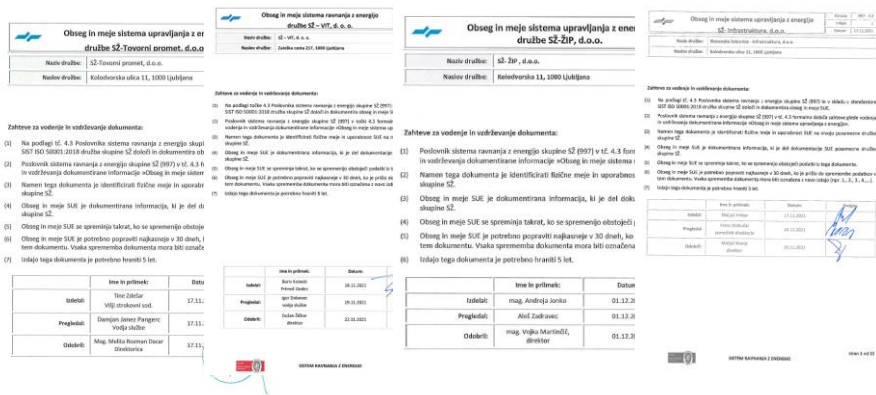
# - Energy policy and energy efficiency goals



(The energy policy of the SŽ Group is based on the Energy Act and other laws in the field of energy, which promote the efficient use of energy and the use of renewable energy sources, as well as laws. The energy policy of the SŽ Group is information that contains the commitments of top management regarding the implementation of EnMS and provides the main guidelines for the effectiveness of EnMS operations.

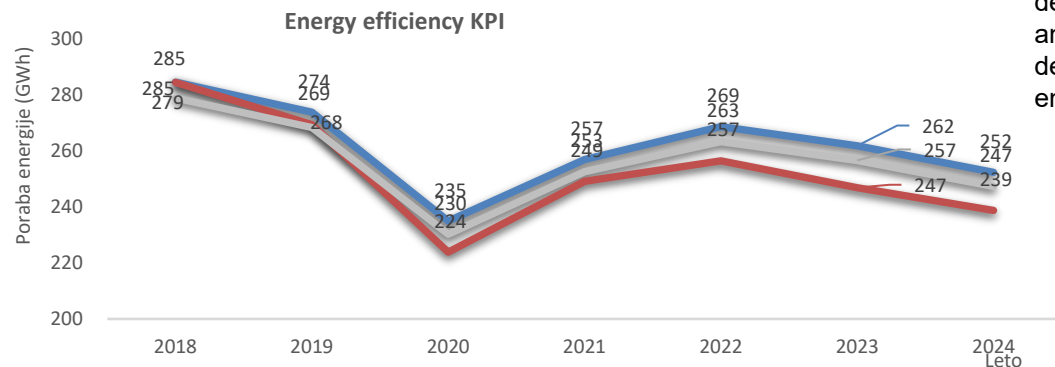
The energy goals of the CEO of Slovenian Railways between 2023 and 2026 are:- improve energy efficiency in buildings by 4%- improve energy efficiency in rail locomotives and passenger trains by 2%- improve energy efficiency in other vehicles by 1%

# - Scope and boundaries of ISO 50001 in the company

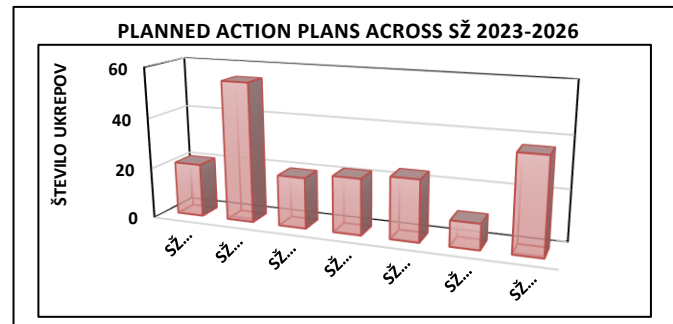


To establish the scope of the Energy Efficiency Management System, each company of the SŽ group must define its boundaries and applicability. When defining the scope of the Energy Efficiency Management System, it is necessary to consider: – external and internal factors – the needs and expectations of interested parties – organizational units, functions, and physical boundaries.

- Energy efficiency Action plans



From the identified largest consumers in the company, KPIs are determined. These are measured according to specific energy use and based on the projected consumption energy baseline, which is defined in the baseline state as determined by the company's first energy review.



Action plans are a set of technical, technological, and organizational actions to improve energy efficiency. Action plans in companies are regularly monitored and updated based on the status of implementation and impact on energy efficiency.

**Estimated investment funds  
approx. 540 million EUR  
(2023-2026)**

## - Monitoring of legislation



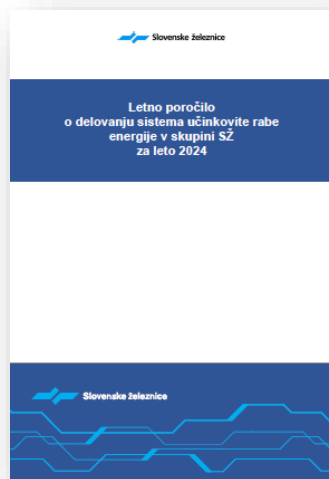
The companies of the SŽ group that have implemented EMS periodically evaluate compliance with legal and other requirements in the field of EMS.

## - Employee education, training, awareness



Proper planning of energy training and staff awareness needs contributes significantly to reducing energy consumption and thereby the negative environmental impacts caused by the activities of the SŽ.

## - Management review (annual) (internal and external audit , internal and external energy review)



The Group management of SŽ and the management of the subsidiaries of the SŽ group, which have implemented the EMS, review at least once a year the appropriateness, effectiveness, efficiency, and adequacy of the EMS implementation in the SŽ group and within each individual company based on the annual report on the operation of the EMS.

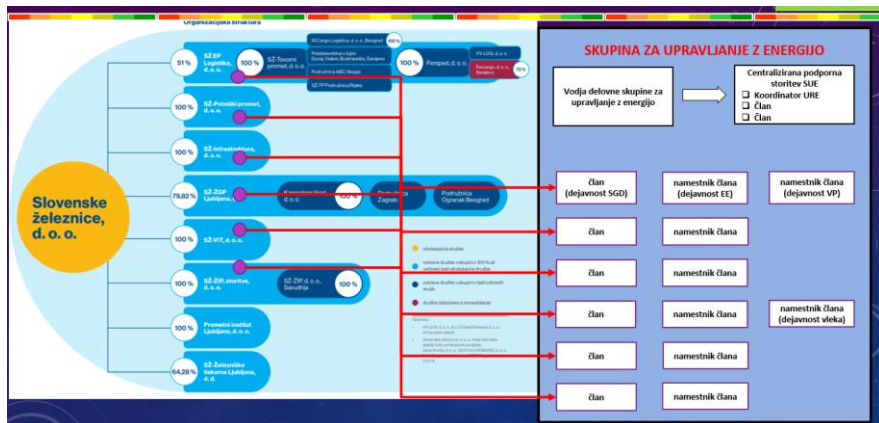
# How ISO 50001 exists in a company

- Roles
- Responsibilities
- Authorities

**1. level** – Group Management SŽ,d.o.o.

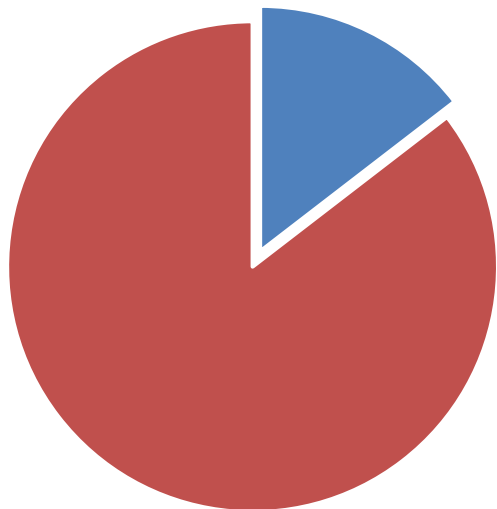
**2. level** – subsidiary company management

**3. level** – Energy Management Team

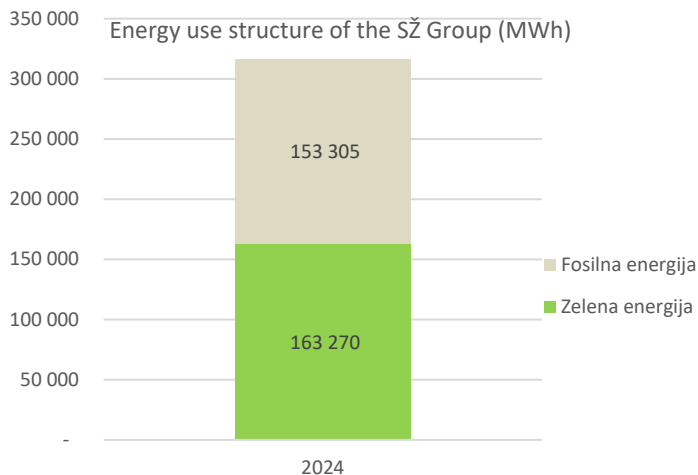


2024

- Energy consumption at SŽ 316 GWh
- Energy consumption within ISO 50001:2018 270 GWh



85 %



2025

- Energy consumption at SŽ 444 GWh
- Energy consumption within ISO 50001:2018 270 GWh
- a new bus company Nomago in the group SŽ

# Energy consumption in the SŽ group - major consumers - energy management



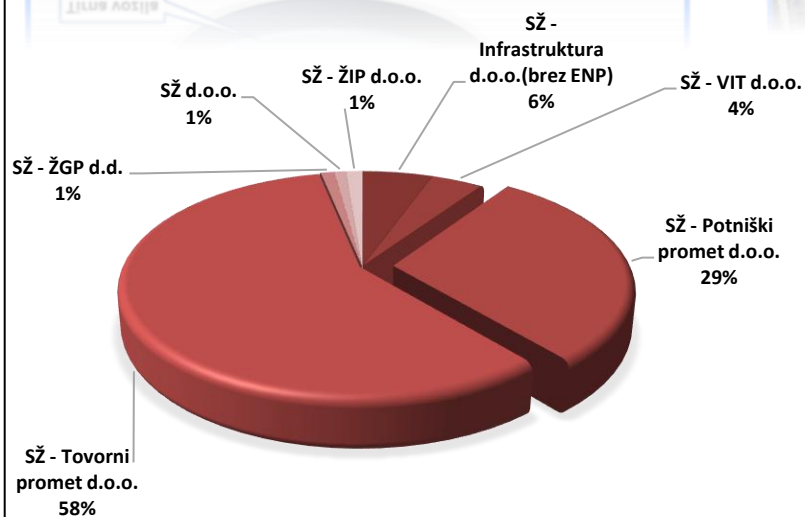
ROAD  
VEHICLES  
Share - 1%

Buildings  
Share - 11%

LOCOMOTIVES  
AND PASSENGER  
TRAINS Share - 88%



## ENERGY CONSUMPTION STRUCTURE OF THE SŽ GROUP





# Energy goals of the SŽ Group

## GOAL 1

Improve the average energy efficiency in buildings by at least 4% compared to the energy baseline,(target by 2026 = 4%)



## GOAL 2

Improvement of the average energy efficiency in the transport of passengers and goods by rail by at least 2% compared to the energy baseline,(target by 2026 = 2%)



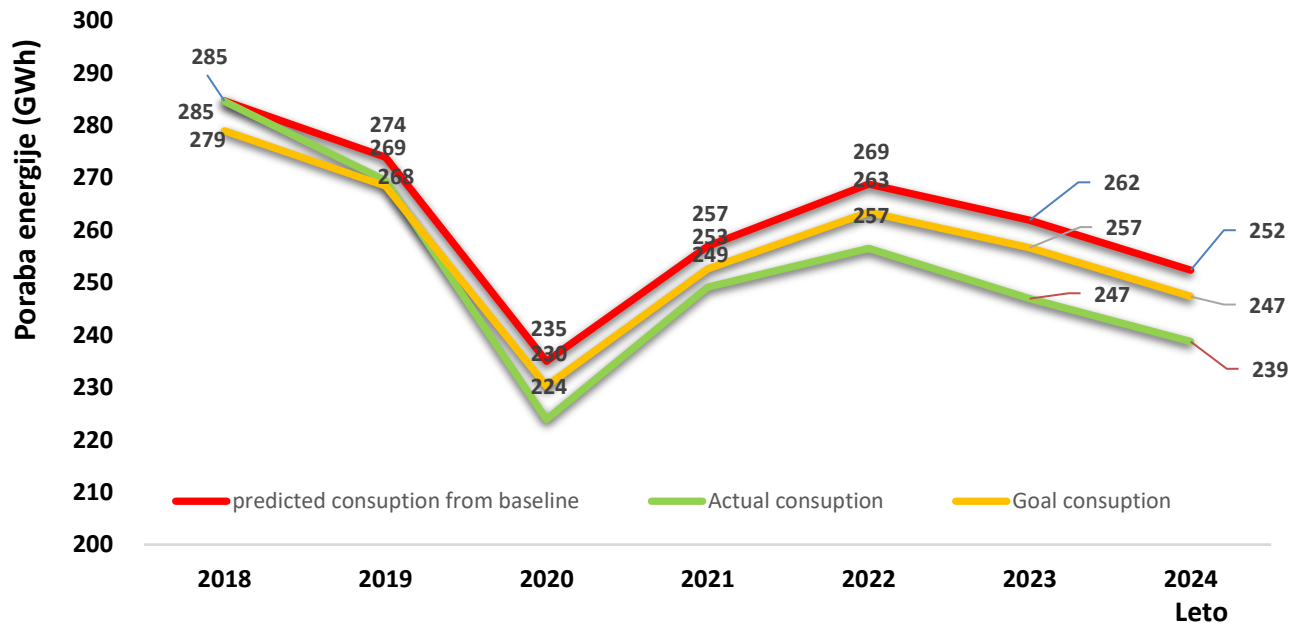
## GOAL 3

Improvement of the average energy efficiency in the use of road vehicles and railway maintenance track vehicles by at least 1% compared to the energy baseline(target by 2026 = 1%)





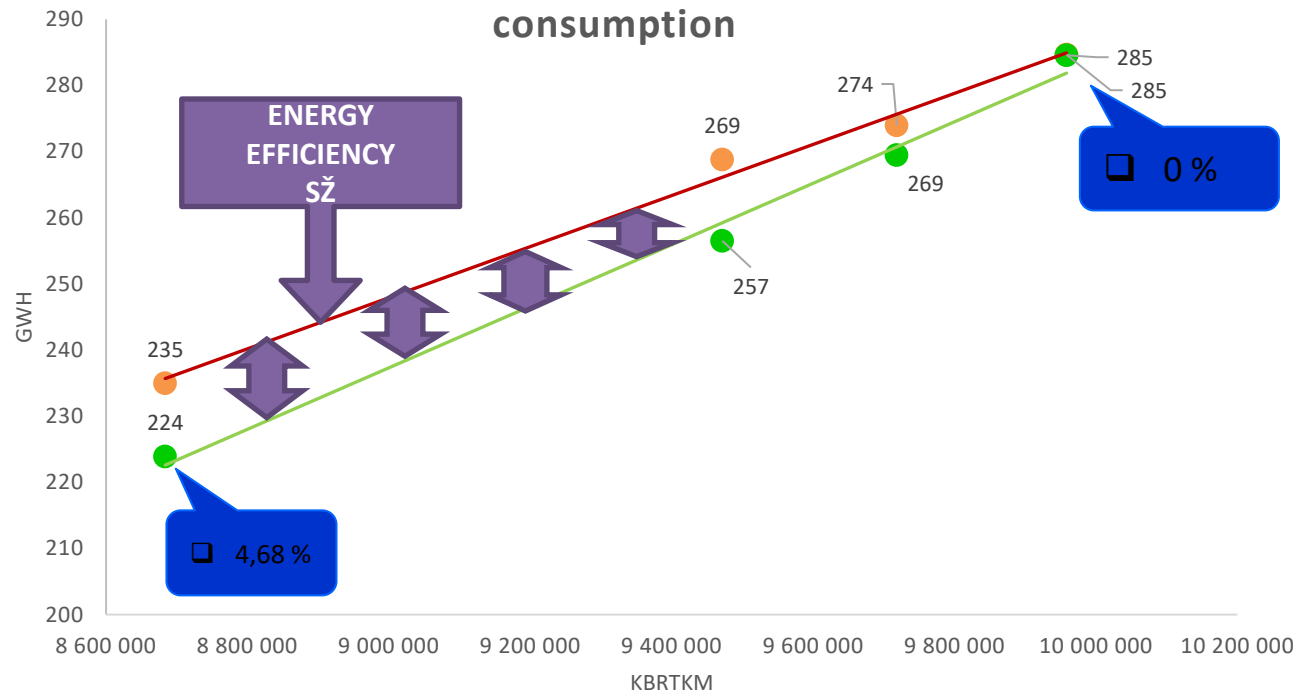
## Energy efficiency of rail vehicles in the SŽ GROUP



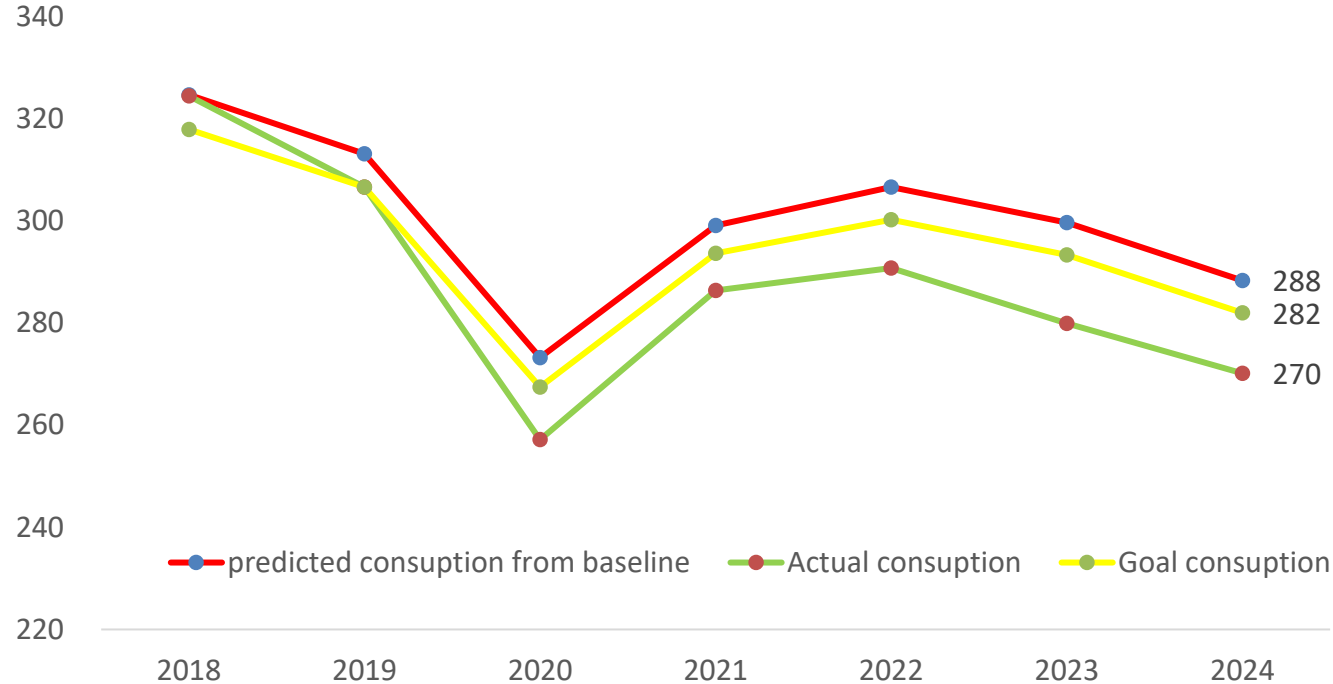




## Regression predicted consumption; actual consumption



## Energy efficiency of the SŽ group (buildings, trains, equipment)



In the year 2024,  
savings of 18,000  
MWh \* 105 EUR =  
1,890,000 EUR.6.25%  
better energy  
efficiency.

# What we have done for energy efficiency

- 108 kilometers of new electrification on the Pragersko-Hodoš line
- We raised the average weight and length of freight trains (new substations freight train 2200 tons)
- We have 72 new passenger trains Stadler, Flirt and Kiss, which have replaced the old inefficient passenger trains
- Large state investments in stations and tracks
- Internal energy audit in train performance (software for train consumption on every electro train, eco driving, eco stabling, operational instructions.....)
- Boost recuperation energy on passenger trains from 8 to 20%
- awareness-raising, employee training for better energy efficiency

## Next step

- 30 new Traxx locomotives (boost of energy efficiency and recuperated energy)
- 4 Vectron locomotives and 20 new passenger cars
- new electric passenger train sets
- battery passenger trains on non-electrified tracks
- new machinery for track maintenance
- Implementation of DAS and c DAS
- Remotorisation of old diesel locomotives 664 and 642 on HVO
- State is planning to build new electrified lines
- New railway track between station Divača and port of Koper
- Energy storage on tracks (collaboration with research institutions)
- own sources of electrical energy (solar power plants)

thank you for your attention !



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