ASHRAE Hellenic Chapter

SATURDAY
NOVEMBER 15, 2025

INTERNATIONAL CONFERENCE

ENERGY IN BUILDINGS ATHENS 2025

ΥΠΟ ΤΗΝ ΑΙΓΙΔΑ ΤΟΥ ΤΕΕ

- DECARBONIZATION & ENERGY SECURITY
- SUSTAINABILITY & GREEN TRANSITION
- ARTIFICIAL & BUILDING INTELLIGENCE
- ENERGY SAVING IN COMMERCIAL & INDUSTRIAL APPLICATIONS

09:00-18:00 | @ DIVANI CARAVEL HOTEL, ATHENS

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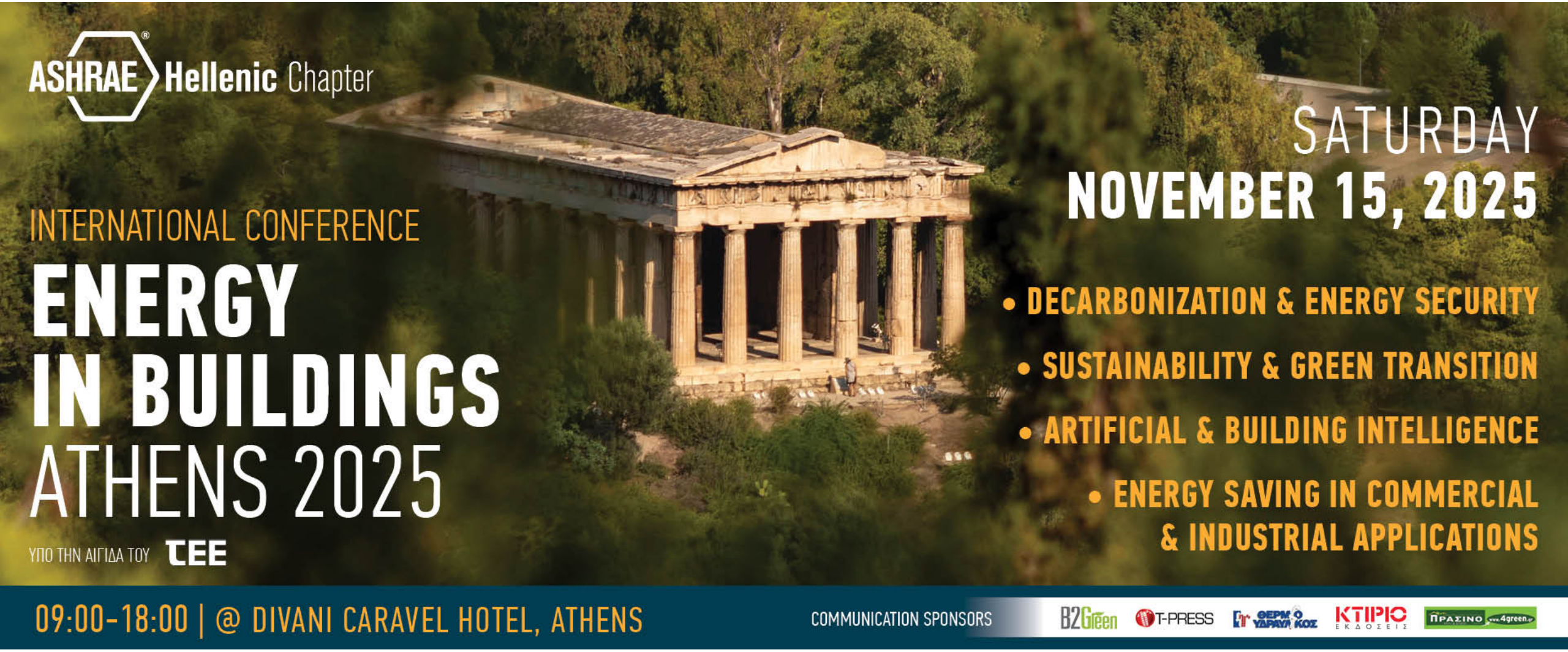

Implementation of Energy Efficiency Measures in Retail Super Markets

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EUREM, CSAP, GPM-b, SFP®, CSRM™, CCML™)

Introduction

- Energy performance
- Carbon footprint
- Voltage Power Optimization System
- Evaporative Condenser Cooling System
- Transition Plan
- Conclusion

Energy performance

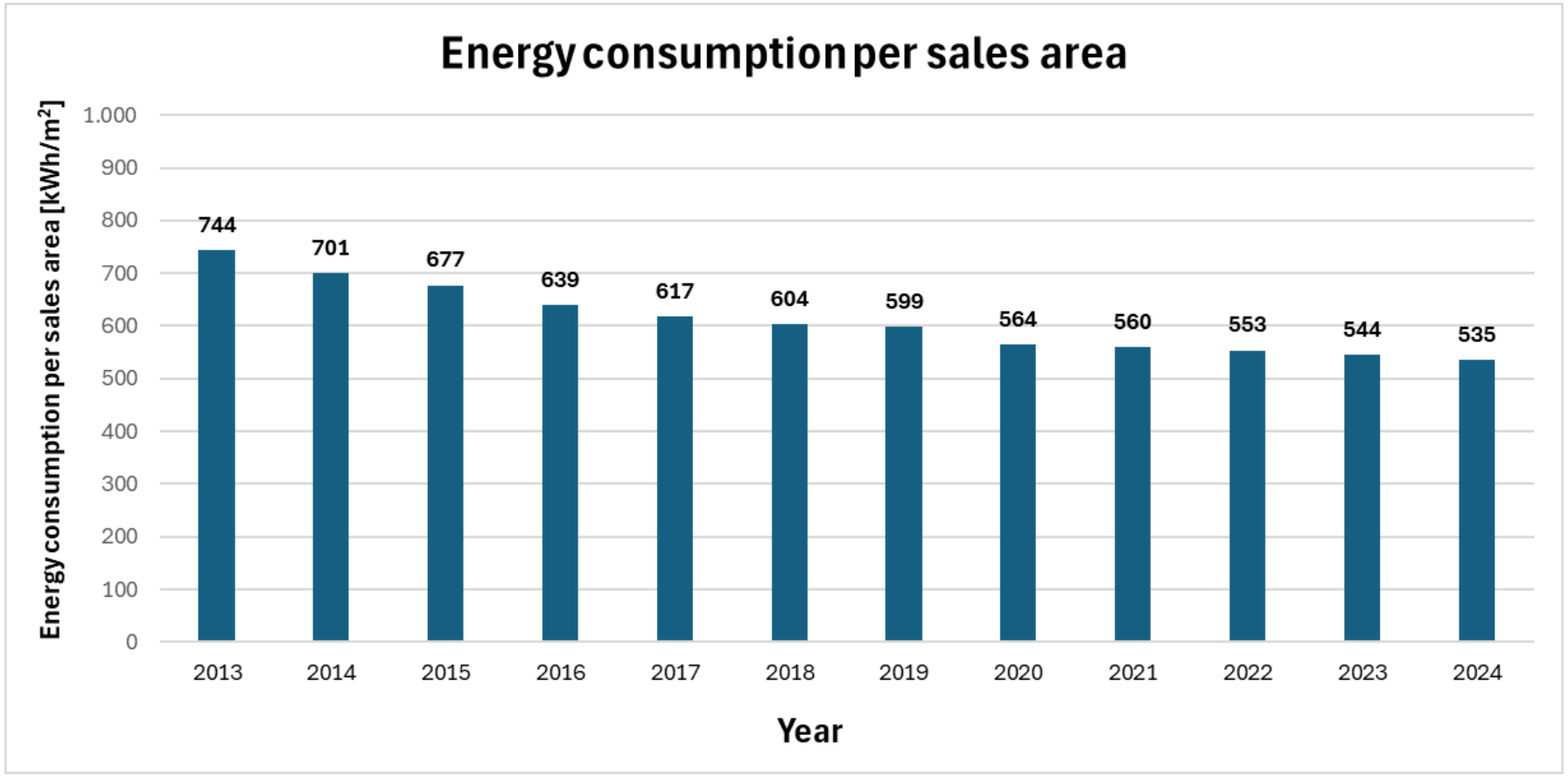


Figure 1

Carbon footprint (GHG)

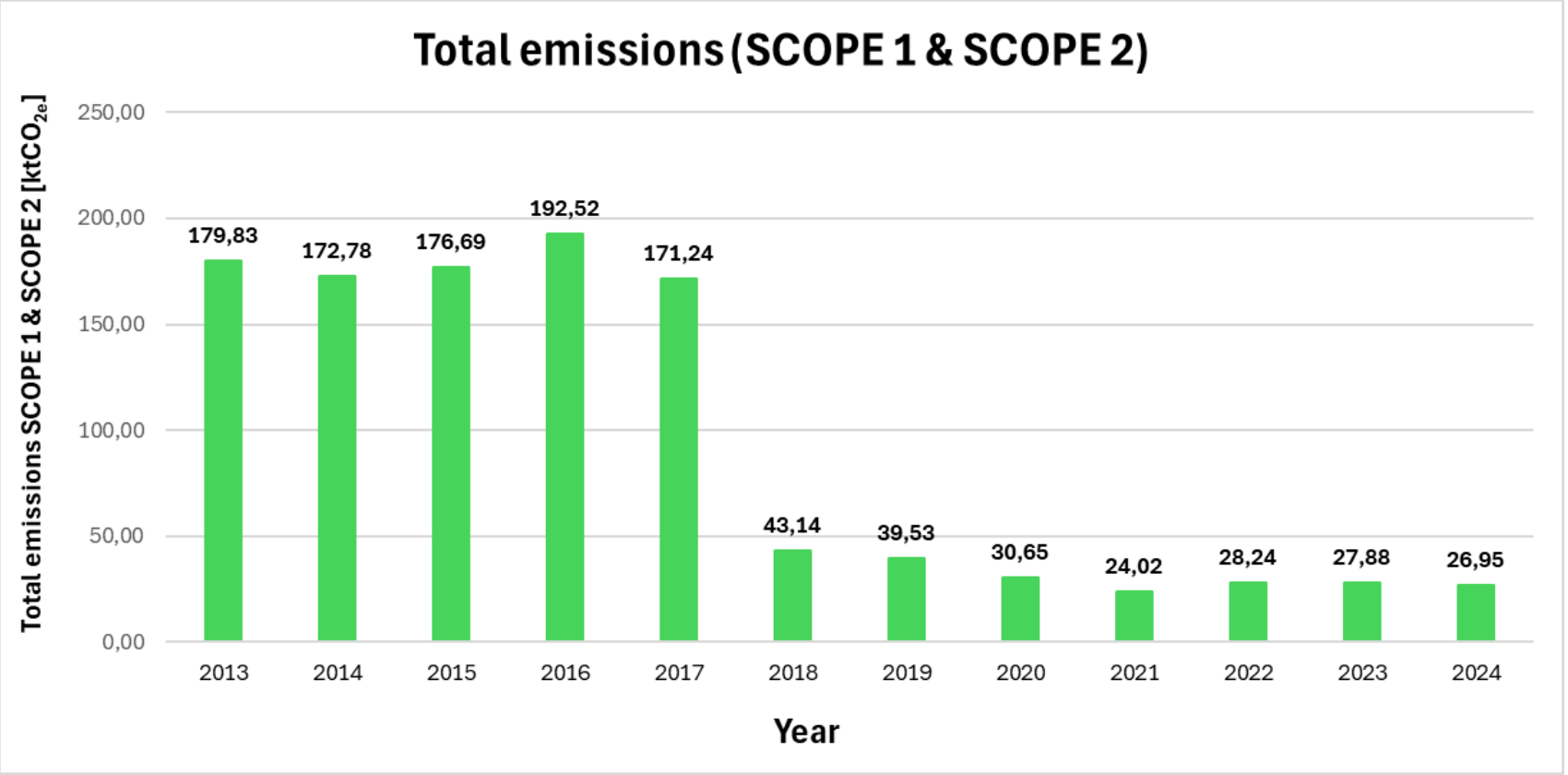
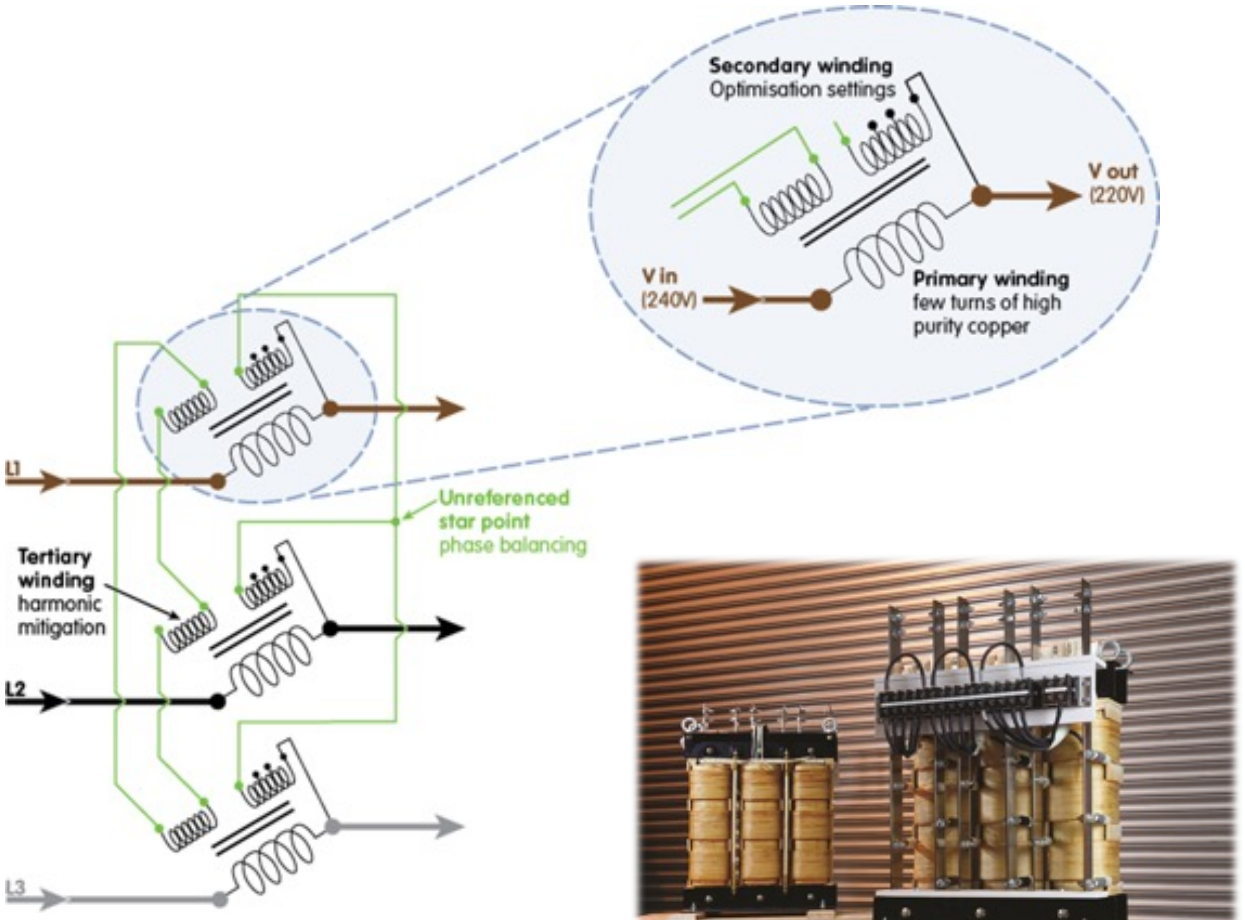


Figure 2

Voltage Power Optimization System



Voltage Power Optimization System

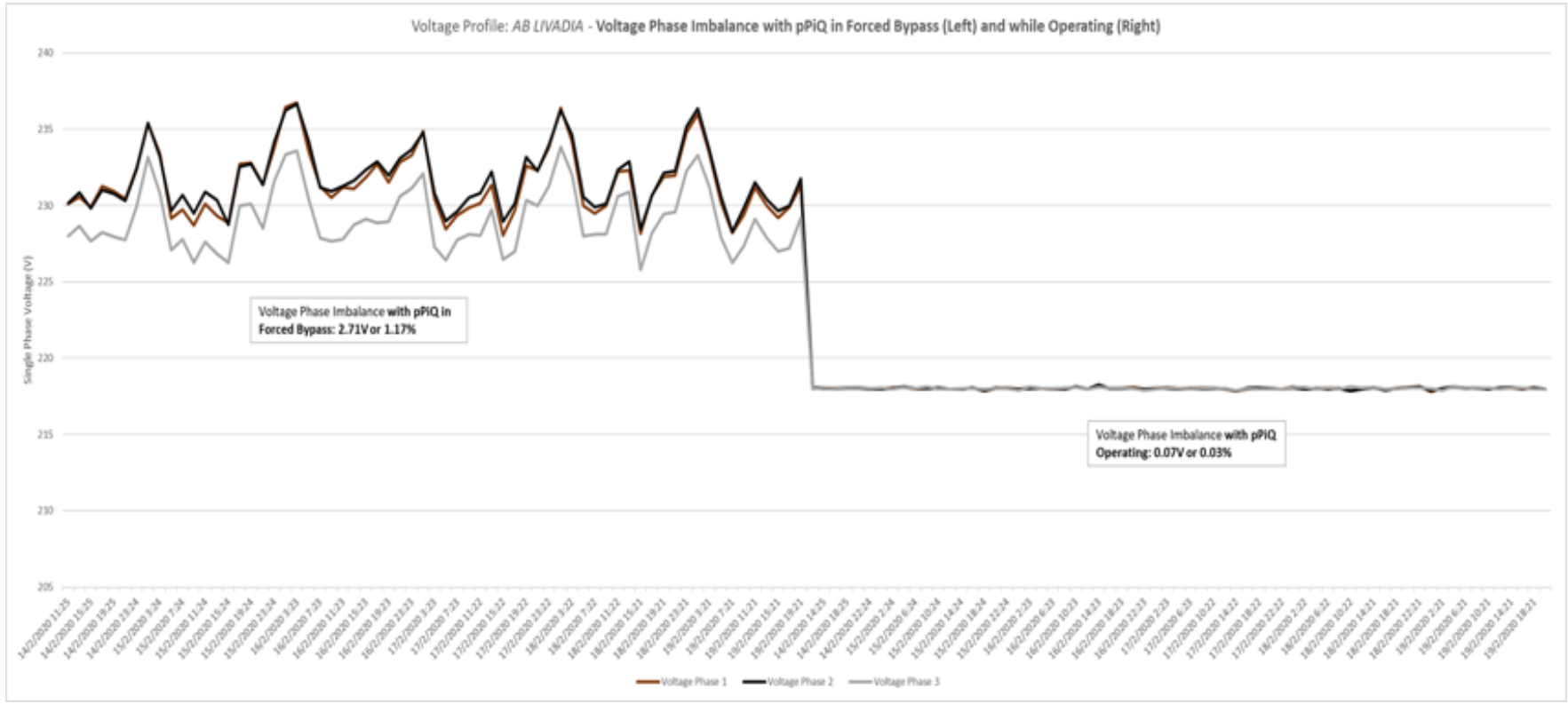


Figure 3

Voltage Power Optimization System

- 5-10 % energy savings
- Precise voltage stabilization and optimization
- 3-phase balancing
- Voltage correction by control unit
- Compensation of Reactive Power (Q)
- No moving parts
- Protection of electrical installation and electronic equipment
- 15 years warranty
- Expected life span over 100 years

Voltage Power Optimization System

Compensation of reactive power

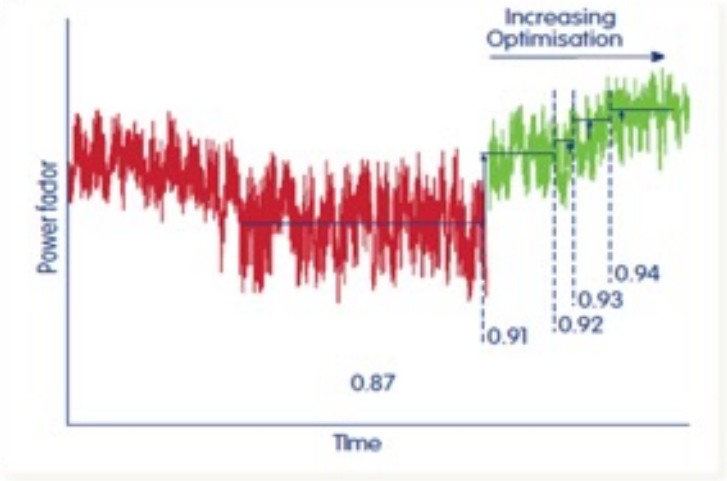


Figure 4

Reduce of harmonics

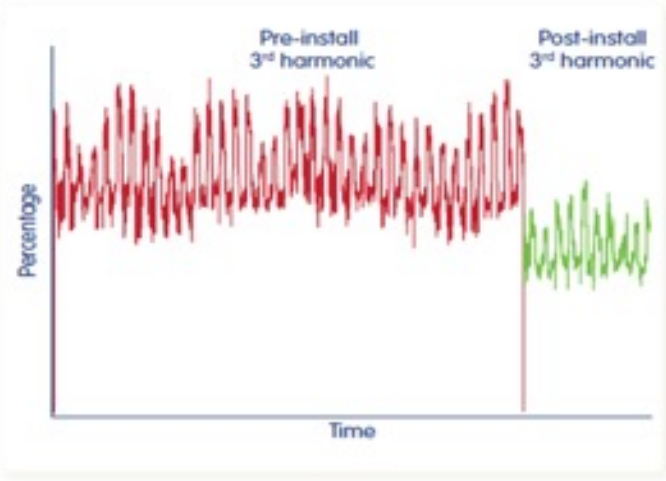


Figure 5

Protection of over-voltage

Figure 6

Voltage Power Optimization System

Year	Facility	Remarks
2017	1 Store	Pilot project
2019	4 Stores	Energy savings 7-10 % per store
2020	4 Stores	280 kVA – 800 kVA
2021	5 Stores	280 kVA – 350 kVA
2022	8 Stores	280 kVA – 350 kVA
2023	5 Stores	280 kVA – 350 kVA
2024	1 Distribution Center (Warehouse)	2.000 kVA system, energy savings 3-5 %, Budget 150 k€
2025	7 Stores	Budget 85 k€ planned

Voltage Power Optimization System

a/a	Year	Facility name	Energy Efficiency Percentage	Energy savings [kWh]	Energy saving costs	Single pay back period [years]
1	2017	Store 1	8,3%	85.000	9.200 €	3,3
2	2019	Store 2	8,6%	54.241	5.695 €	6,3
3	2019	Store 3	9,0%	57.206	6.007 €	6,0
4	2019	Store 4	9,2%	68.696	7.213 €	4,9
5	2019	Store 5	8,8%	138.832	14.577 €	3,7
6	2020	Store 6	9,2%	119.946	12.594 €	4,3
7	2020	Store 7	8,9%	90.829	9.537 €	4,0
8	2020	Store 8	8,8%	126.696	13.303 €	4,3
9	2020	Store 9	8,6%	240.456	25.248 €	4,1
10	2020	Store 10	9,2%	96.734	10.157 €	5,5
11	2021	Store 11	8,8%	111.103	11.666 €	4,8
12	2021	Store 12	9,5%	102.104	10.721 €	5,3
13	2021	Store 13	8,7%	67.434	8.429 €	4,5
14	2021	Store 14	8,9%	79.922	9.990 €	4,5
15	2021	Store 15	8,7%	67.860	8.482 €	4,5
16	2022	Store 16	8,8%	94.752	18.950 €	2,8
17	2022	Store 17	8,4%	66.143	13.229 €	2,6
18	2022	Store 18	9,2%	64.186	12.837 €	3,1
19	2022	Store 19	9,0%	52.885	10.577 €	3,8
20	2022	Store 20	8,2%	67.822	13.564 €	2,5
21	2022	Store 21	9,0%	62.874	12.575 €	3,2
22	2022	Store 22	8,3%	50.947	11.208 €	3,9
23	2023	Store 23	8,5%	75.725	16.659 €	3,0
24	2023	Store 24	8,8%	60.957	13.411 €	3,8
25	2023	Store 25	8,3%	75.124	16.527 €	2,8
26	2023	Store 26	7,8%	56.110	12.344 €	3,7
27	2023	Store 27	8,3%	57.562	12.664 €	3,6
28	2024	Distribution Center	3,0%	251.247	55.274 €	2,8
		Total		**2.543.394**	**382.641 €**	

Voltage Power Optimization System

- Case study (pilot project in 2017)
- Implementation in June 2017
- Annual energy savings 85.000 kWh
- Annual energy saving costs 9.200 euro
- Single Pay back period 3,3 years

Voltage Power Optimization System

IMVP Report

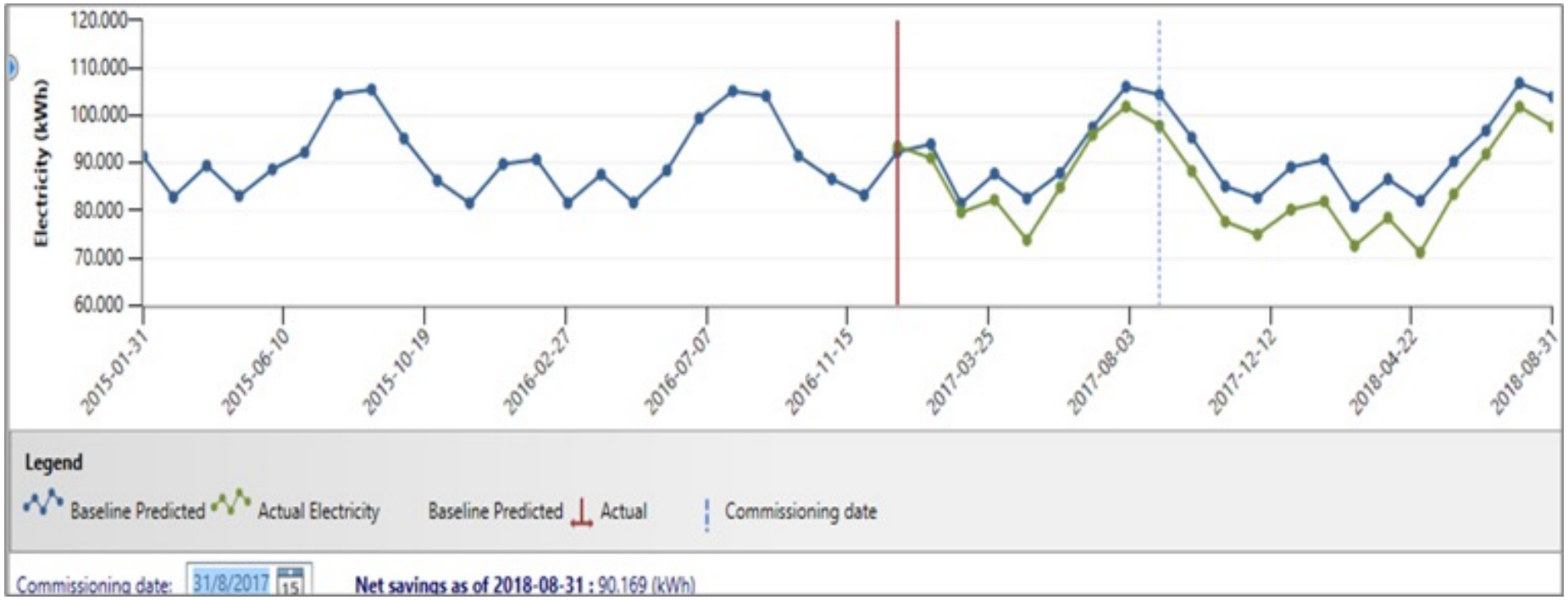


Figure 7

Voltage Power Optimization System

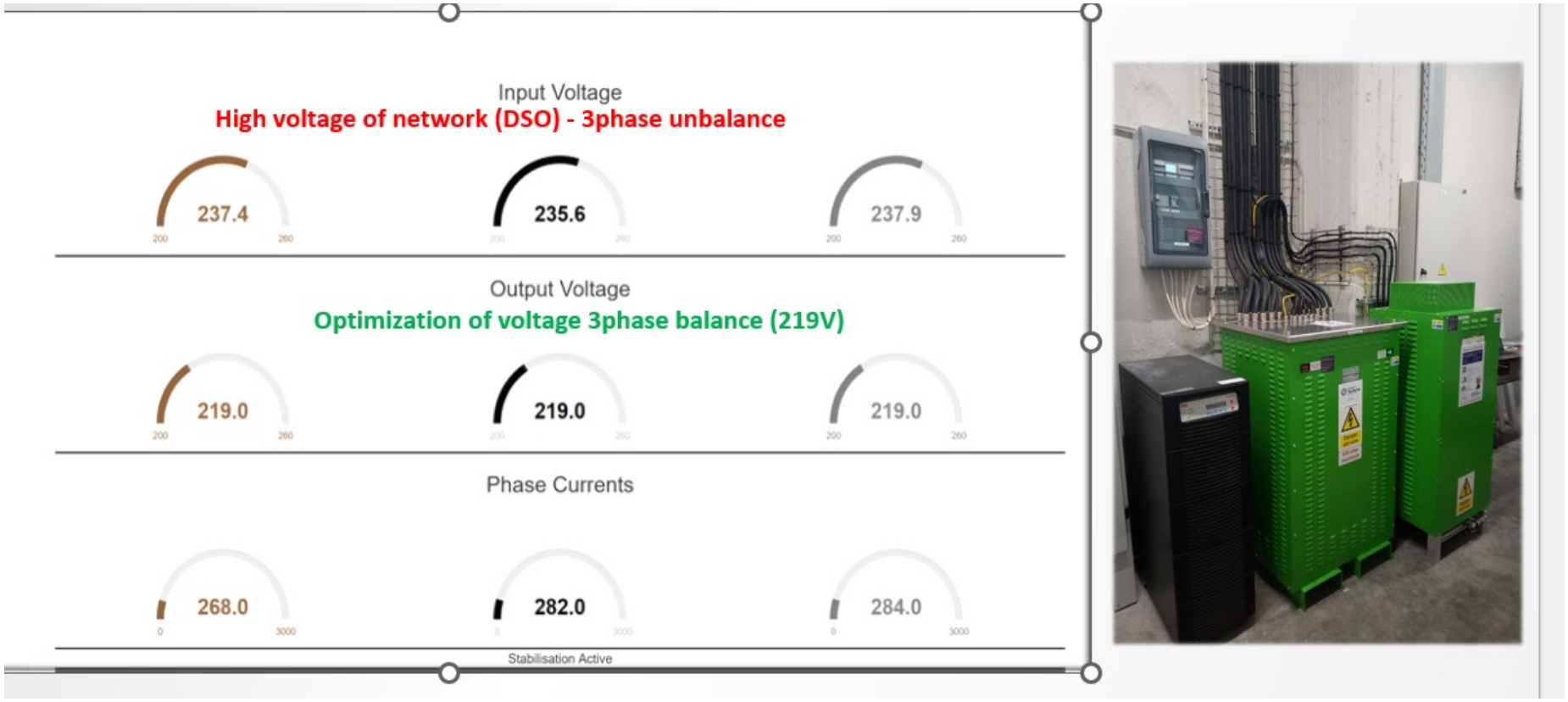


Figure 8

Voltage Power Optimization System

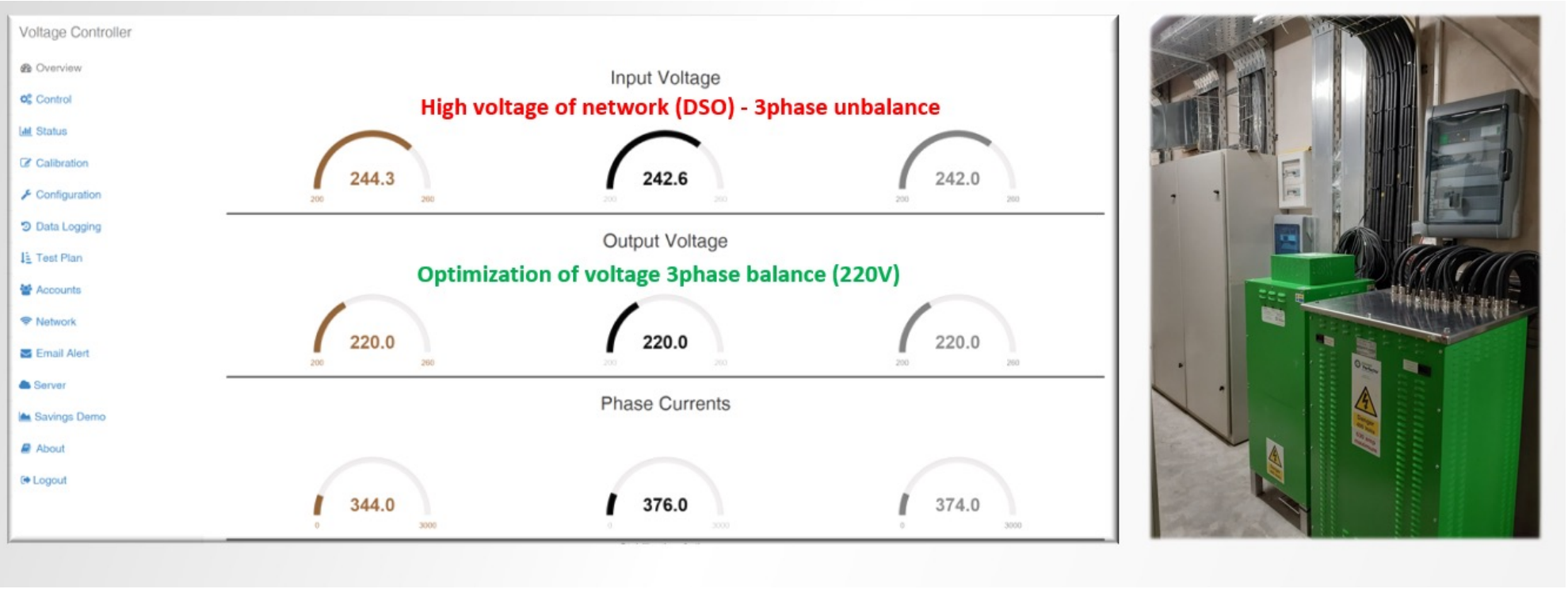


Figure 9

Voltage Power Optimization System

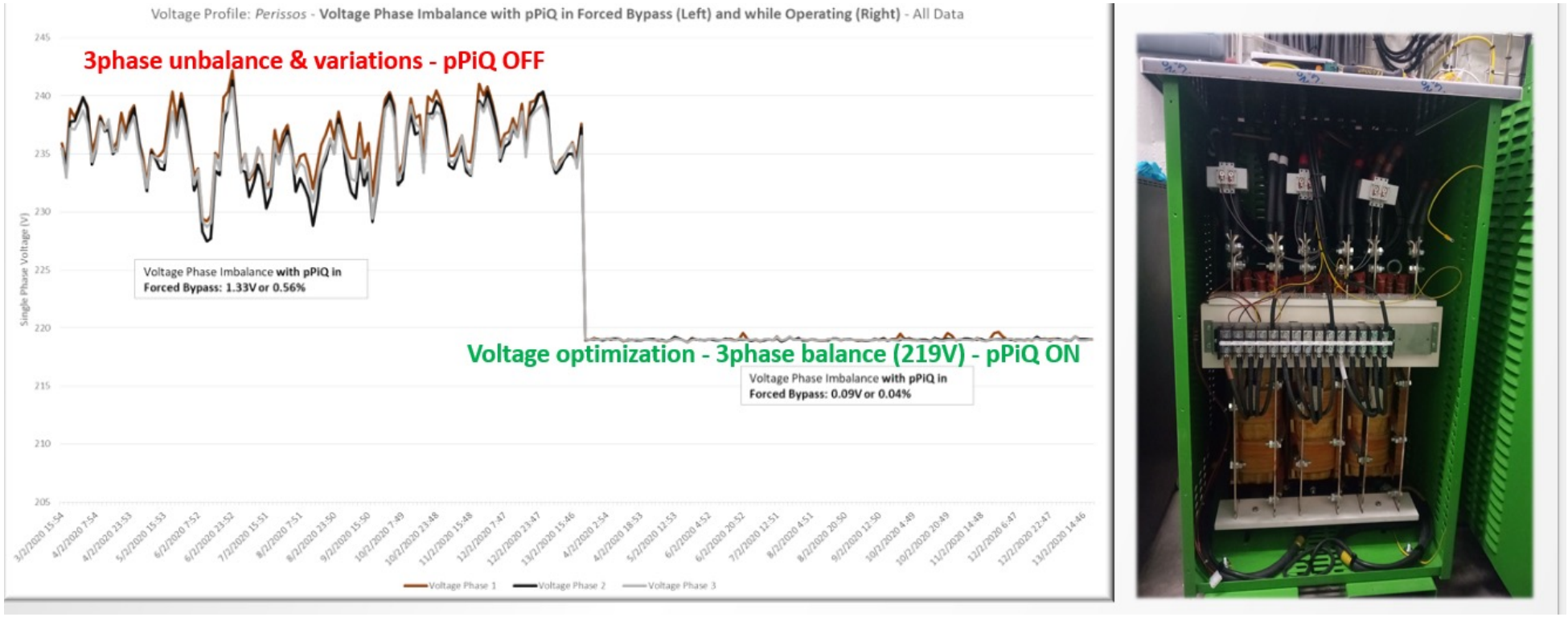


Figure 10

Evaporative Condenser Cooling System

- EC Cooling System is a pad system that decreases the inlet temperature for rooftop condensers.
- By decreasing the inlet conditions, you decrease the risk of high pressure alarms and increase the efficiency of your cooling system as a bonus.
- For reduction of 1°C in temperature on the inlet of condenser, it increases the efficiency of the condenser by a minimum of 2%.

Evaporative Condenser Cooling System

- Warm ambient air through the EC Cool matrix comes into contact with water that flows freely across the matrix. Heat energy is absorbed by the water causing evaporation of the water and cooling of the air.
- The pre-cooled air through the condenser system allows heat energy from the condenser coil to dissipate more easily thereby increasing the cooling capacity for the same or in most cases less energy consumption

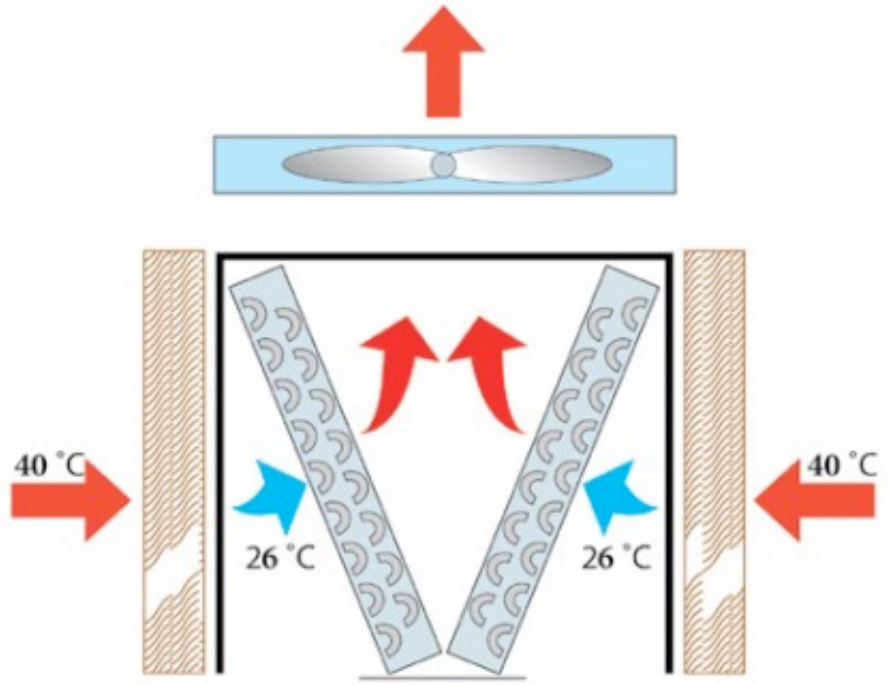


Figure 11

Evaporative Condenser Cooling System

- Case study in Super Market

Evaporative Condenser Cooling System

Evaporative Condenser Cooling System

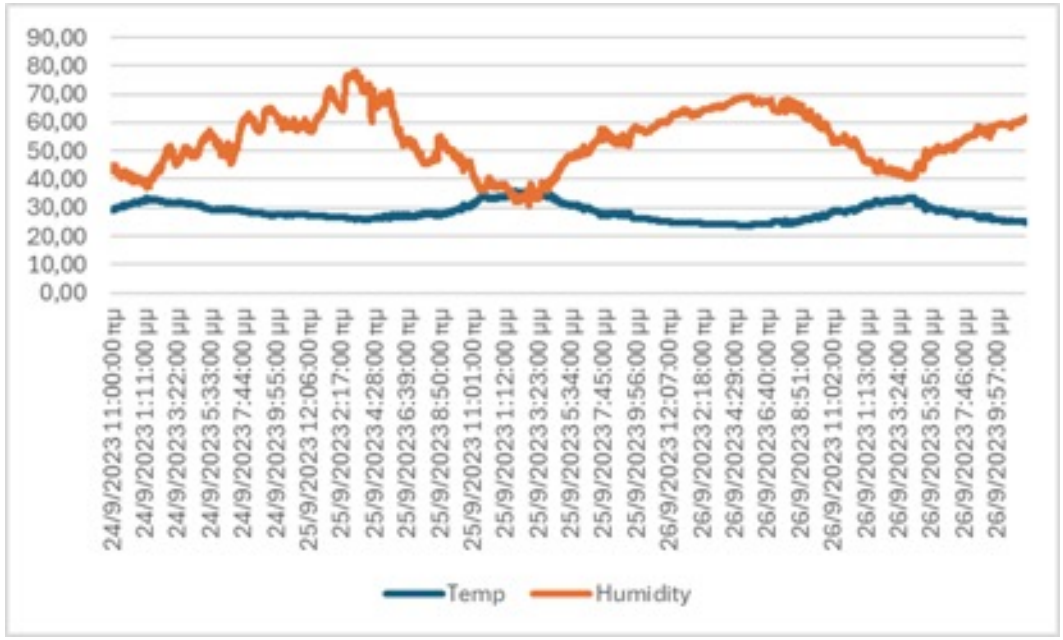


Figure 12. External temperature and humidity

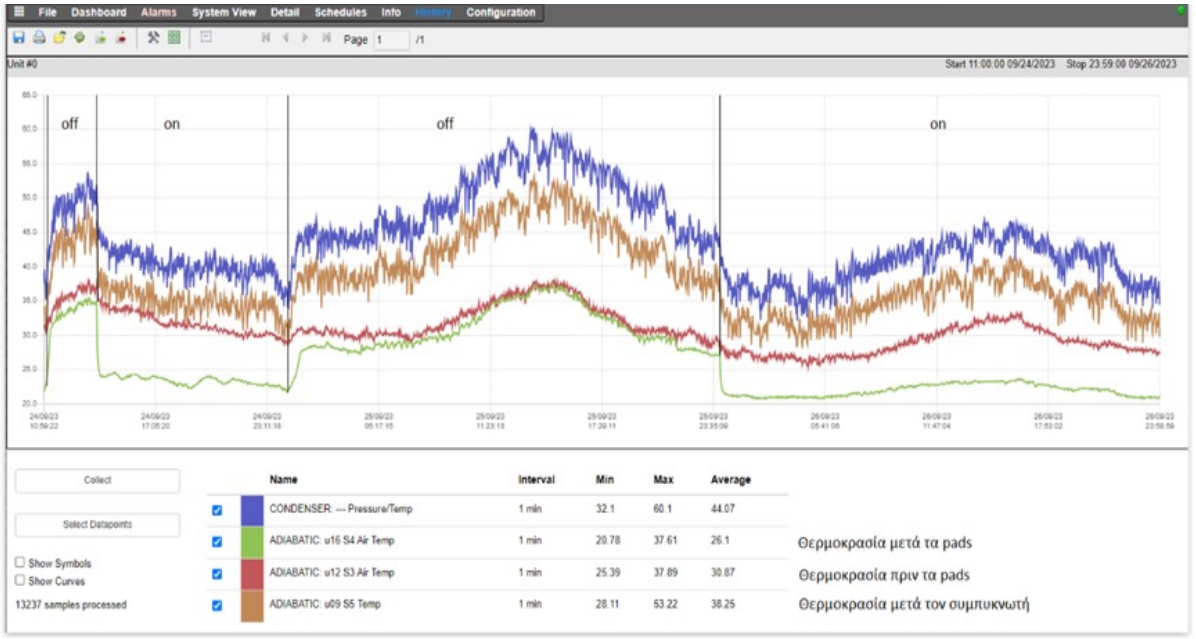


Figure 13. Air temperature before pads and condenser, Temperature of condenser

Evaporative Condenser Cooling System

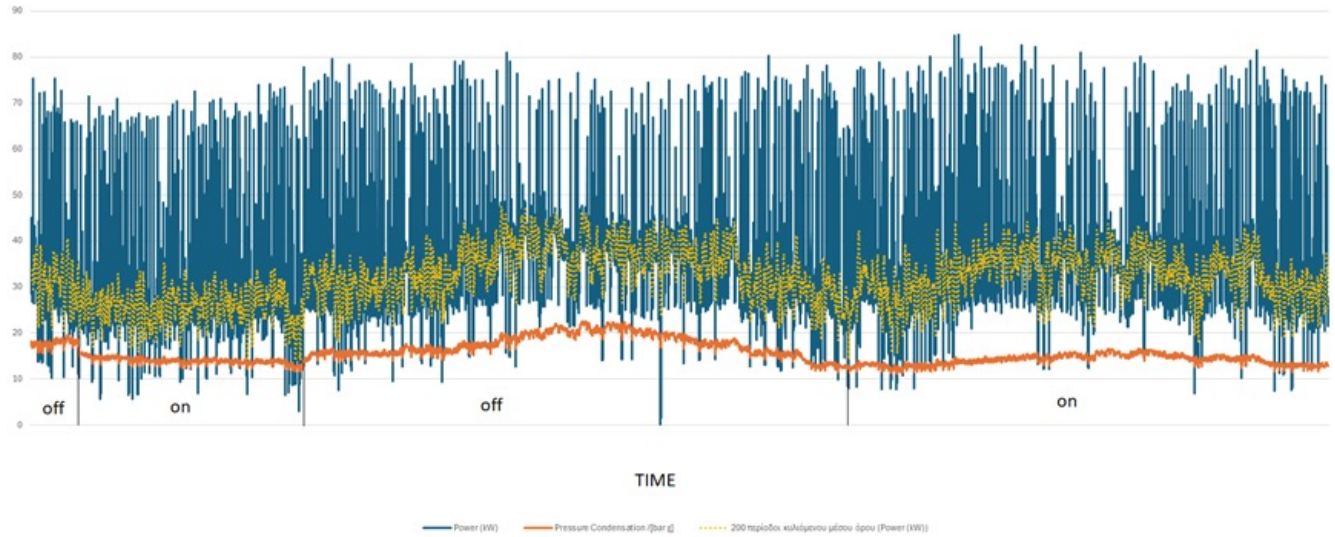


Figure 14. Condenser pressure and absorbed power

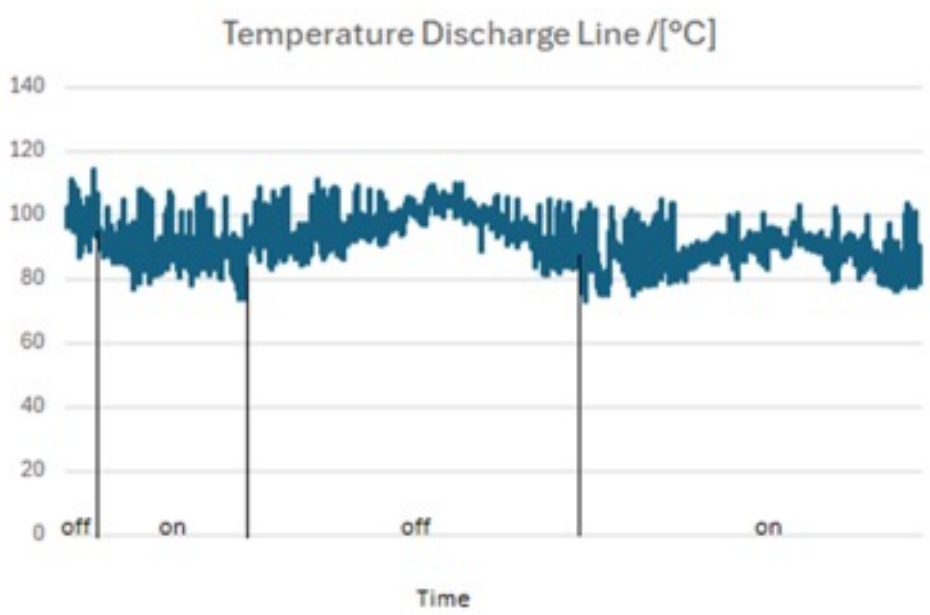


Figure 15. Temperature Discharge

Evaporative Condenser Cooling System

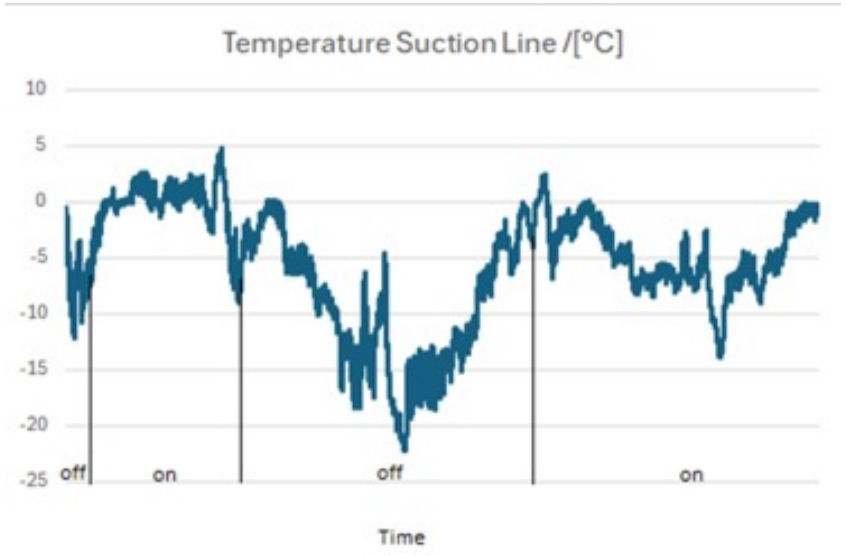


Figure 16. Temperature Suction Line

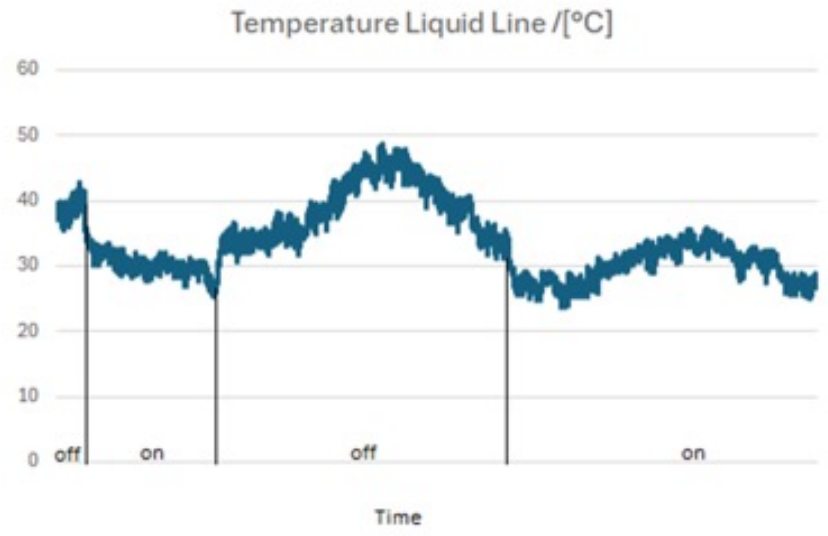


Figure 17. Temperature Liquid Line

Evaporative Condenser Cooling System

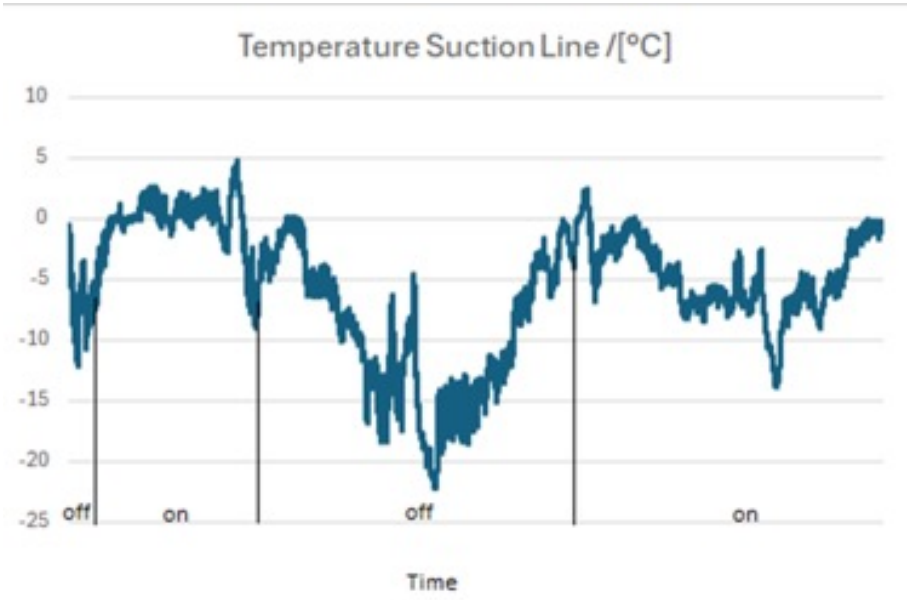


Figure 18. Temperature Suction Line

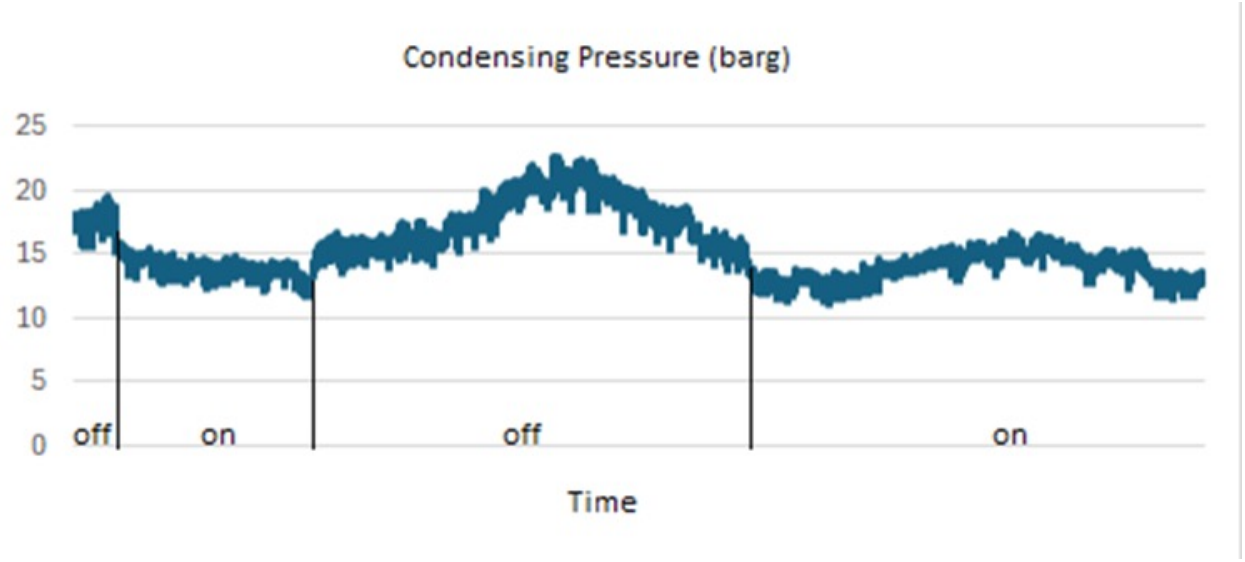
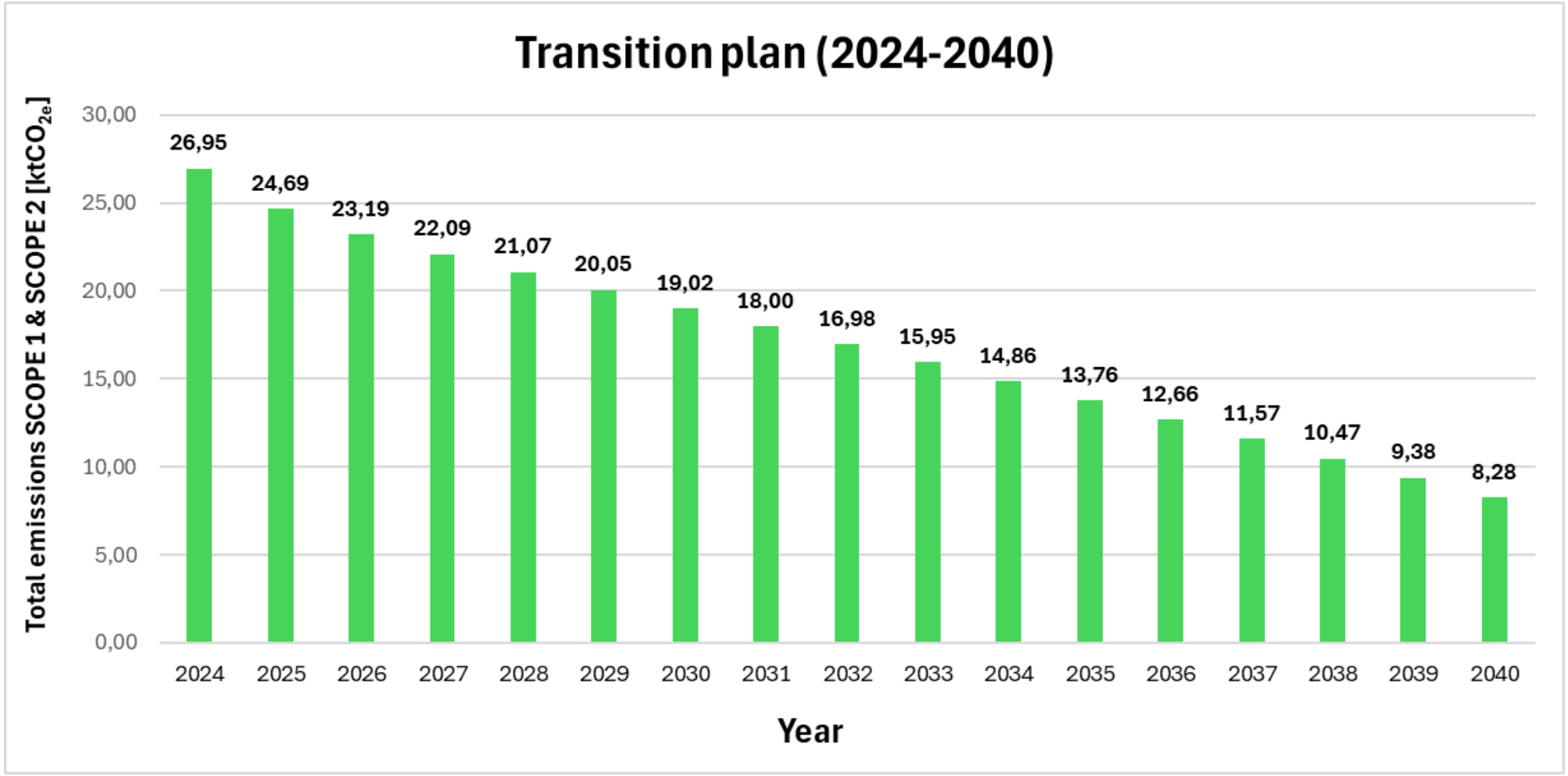


Figure 19. Condensing Pressure

Evaporative Condenser Cooling System

- Energy efficiency 20 % at temperature 32 °C
- Expected higher energy efficiency in case external temperature and humidity are higher
- Reducing peak loads (load management)
- Reducing refrigerant leakages
- Reducing CO_2 emissions (SCOPE 1 & SCOPE 2)
- Lower maintenance costs
- Increasing life span of compressors

Transition plan



Conclusion

- Sustainable solutions with high impact in transition plan
- Adaptation of refrigeration system to extreme heat waves during summer period
- Attractive Investment Opportunities
- Reducing of peak loads
- Improving energy efficiency
- Reducing of operations costs
- Extension life span of equipment

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THANK YOU!

Q & A

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