



Municipality of
Vari
Voula
Vouliagmeni

«Holistic Energy Efficiency Action Plan towards Climate Change Mitigation and Sustainability of the City of Vari Voula Vouliagmeni»

18th International Conference-Energy and Climate Change

Athens 10th October 2025

Dr. Maria Tsarmpopoulou Dr. Miltiadis Kavrakos



Municipality's Energy Profile

- **Climate Change Mitigation at Local Level.**
- **Energy Transition.**
- **Monitoring/Measurement of Significant Parameters (air quality, noise, filling of waste bins).**
- **BEMS Installation.**
- **Improvement of Buildings Technical Characteristics.**
- **Installation of PV Systems.**
- **Improvement of Thermal and Optical Conditions of the End-Users.**



Quantification of Actions/Measures

- Municipality is investing €6.736.061 for the Energy Upgrade of Municipal Building Stock.
- Financial Support comes from both European and National Resources.
- 36 building: both School and Municipal Service Buildings are being upgraded.



- Installation of Photovoltaic Panels, of total capacity of 464kWp with an average annual energy production of 719.2MWh/y.
- Submission of “Building Energy Performance Plan” & Municipal Emissions Reduction Plan” Reports.
- Installation of New Heating Systems (Heat Pumps) of total thermal power 2.205kW.

Results in Numbers

- 2.216 of LED technology lighting systems replaced old indoor lighting systems, achieving 30% of energy saving.
- Energy upgrade at least three (3) categories according to the energy performance certificates (energy classification set by the Ministry of Energy).
- Net-Metering/Net Billing systems to cover own needs.
- Approval of Phase 1 of the energy upgrade “Electra” Program.
- Participation to Energy Upgrade Program “Athina”.



Street-Lighting Results

- 6.399 LED lights replaced old street-lighting systems.
- Saving 3,5M€ during 11/12/2017-07/10/2025.
- Energy Saving in MWhs almost 24.000.



Εξοικονόμηση **3.463.070,96 €** σύμφωνα με την κατανάλωση των παλαιών φωτιστικών
από 11/12/2017 – 07/10/2025



Συνολική κατανάλωση **15.003.560,13 kWh** από 11/12/2017 – 07/10/2025

Εξοικονόμηση σύμφωνα με την κατανάλωση των παλαιών φωτιστικών **23.883.248,02 kWh**



Εκπομπές CO2 **8.251.958,07 Kg** από 11/12/2017 – 07/10/2025

Εξοικονόμηση Εκπομπών CO2 σύμφωνα με τις εκπομπές των παλαιών φωτιστικών **13.135.786,41 Kg**

Expected Outcomes

- Saving Electricity leads to the reduction of GreenHouse Gas Emissions at Local and Regional Level.
- Rational Use of Energy leads to Municipality's Total Energy Balance (production from RES compensates self-consumption, installation of Hybrid Systems).
- Capitalization of Knowledge and Experience.
- Supporting other Agencies at National/Regional Level towards the transition to a Zero Carbon Economy.



SWOT Analysis

Strengths

- **Fruitful Collaboration with Program Management Agencies.**
- **Prompt Response of Municipality to the requirements/deadlines of Programs.**
- **Supervision and daily communication with Contractors.**

Weaknesses

- **Application to HEDNO (Hellenic Electricity Distribution Network Operator S.A.) for the connection of PV panels to the local grid.**
- **Additional cost covered by the Municipality to support the increase of power supply in order to insert new loads (heat pump loads) into the local grid (fees to HEDNO).**





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Energy Efficiency Certificates (EEC)

ΔΗΜΟΣ ΒΑΡΗΣ – ΒΟΥΛΑΣ – ΒΟΥΛΙΑΓΜΕΝΗΣ

«Ενεργειακές αναβαθμίσεις και εγκατάσταση ΑΠΕ σε κτήρια του Δήμου Βάρης-Βούλας-Βουλιαγμένης στο πλαίσιο του Χρηματοδοτικού Μηχανισμού ΕΟΧ 2014-2021 “Gr-Energy”»

ΠΙΝΑΚΑΣ ΕΝΕΡΓΕΙΑΚΩΝ ΚΑΤΑΤΑΞΕΩΝ

ΚΤΙΡΙΑΚΗ ΜΟΝΑΔΑ	ΕΝΕΡΓΕΙΑΚΗ ΚΑΤΗΓΟΡΙΑ ΑΡΧΙΚΟΥ ΠΕΑ	ΕΝΕΡΓΕΙΑΚΗ ΚΑΤΗΓΟΡΙΑ ΕΧ POST ΠΕΑ	ΠΟΣΟΣΤΟ ΕΞΟΙΚΟΝΟΜΗΣΗΣ ΠΡΩΤΟΓΕΝΟΥΣ ΕΝΕΡΓΕΙΑΣ ΕΧ POST ΠΕΑ	ΠΟΣΟΣΤΟ ΕΞΟΙΚΟΝΟΜΗΣΗΣ ΠΡΩΤΟΓΕΝΟΥΣ ΕΝΕΡΓΕΙΑΣ ΑΡΧΙΚΟΥ ΠΕΑ
1 ^ο ΔΗΜΟΤΙΚΟ ΣΧΟΛΕΙΟ ΒΑΡΗΣ	A	A+	79,70 %	74,60 %
1 ^ο ΓΥΜΝΑΣΙΟ ΒΑΡΗΣ	A+	A+	91,70 %	78,00 %
ΓΕΝΙΚΟ ΛΥΚΕΙΟ ΒΑΡΗΣ	A+	A+	89,40 %	87,60 %
2 ^ο ΝΗΠΙΑΓΩΓΕΙΟ ΒΑΡΗΣ	B+	A+	96,00 %	71,50 %
ΚΟΙΝΩΝΙΚΕΣ ΥΠΗΡΕΣΙΕΣ ΔΗΜΟΥ ΒΟΥΛΑΣ	B	B+	63,50 %	42,40 %
ΠΑΙΔΙΚΟΣ ΣΤΑΘΜΟΣ ΒΟΥΛΑΣ	B+	A	69,40 %	58,50 %
ΚΤΙΡΙΟ ΤΕΧΝΙΚΩΝ ΥΠΗΡΕΣΙΩΝ	B+	B+	50,70 %	59,40 %

ΓΕΩΡΓΙΟΣ ΠΑΝ. ΞΥΛΙΑΣ
ΔΙΠΛ. ΜΗΧΑΝΟΛΟΓΟΣ - ΗΛΕΚΤΡΟΛΟΓΟΣ Ε.Μ.Π.
ΕΝΕΡΓΕΙΑΚΗ ΕΠΙΘΕΩΡΗΤΗΣ Τ.Τ.Ε.Ε.
ΜΕΛΟΣ Τ.Ε.Ε. ΧΡΩΜΟΣ ΜΗΤΡΩΟΥ 28856
ΑΦΜ 024700440 - ΔΟΥ Π. ΦΑΛΗΡΟΥ
ΗΛΕΘΝ 5 - 174 56 - ΑΛΙΜΟΣ, ΤΗΛ. 210 9940992
ΚΙΝ. 6977610779 - email: gxylias@gmail.com

ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΕΝΕΡΓΕΙΑΚΗΣ ΑΠΟΔΟΣΗΣ (ΠΕΑ) ΜΟΥΤΟΥΣΗ 2 16672 , ΒΑΡΗ

Αρ. Πρωτοκόλλου:	28039/2024	Αρ. Ασφαλείας:	1TK30-57226-13ML9-5
Ημερομηνία Έκδοσης:	28/03/2024	Ημερομηνία Ισχύος:	28/03/2034

• Ελέγξτε την εγκυρότητα του ΠΕΑ: <https://www.buildingcert.gr/checkCert.view>

Τίτλος Κτηριακής Μονάδας:	1 ^ο ΓΥΜΝΑΣΙΟ ΒΑΡΗΣ
Χρήση:	Δευτεροβάθμιας εκπαίδευσης
Κλιματική Ζώνη:	B
Συνολική Επιφάνεια:	2161.1
Ωφέλιμη Επιφάνεια:	2136.1



Ενεργειακή κατηγορία:	Υφιστάμενη	Δυννητική
Μηδενικής Ενεργειακής Κατανάλωσης:		
EP ≤ 0,33 R _R	A+	A+
0,33 R _R < EP ≤ 0,50 R _R	A	
0,50 R _R < EP ≤ 0,75 R _R	B+	
0,75 R _R < EP ≤ 1,00 R _R	B	
1,00 R _R < EP ≤ 1,41 R _R	C	
1,41 R _R < EP ≤ 1,82 R _R	D	
1,82 R _R < EP ≤ 2,27 R _R	E	
2,27 R _R < EP ≤ 2,73 R _R	F	
2,73 R _R < EP	G	

• Μετά την εφαρμογή των παρεμβάσεων ενεργειακής αναβάθμισης σύμφωνα με τη βέλτιστη (1η) σύσταση

Υπολογιζόμενη ετήσια κατανάλωση πρωτογενούς ενέργειας*	
Κτηρίου αναφοράς [kWh/m²]:	71.4
Επιθεωρούμενου κτηρίου [kWh/m²]:	12.2

Πραγματική Ετήσια Κατανάλωση Επιθεωρούμενου Κτηρίου:	
Ηλεκτρικής ενέργειας [kWh/m²]:	0.0
Θερμικής ενέργειας (καύσιμα) [kWh/m²]:	0.0
Συνολική ετήσια κατανάλωση πρωτογενούς ενέργειας [kWh/m²]:	0.0

Ετήσιες εκπομπές CO2 επιθεωρούμενου κτηρίου	
Υπολογιζόμενες ετήσιες εκπομπές CO2 [kg /m²]:	17.1
Πραγματικές ετήσιες εκπομπές CO2 [kg /m²]:	0.0

Θερμική άνεση ☐	Οπτική άνεση ☐	Ακουστική άνεση ☐	Ποιότητα εσωτερικού αέρα ☐
• Η ενεργειακή απόδοση ενός κτηρίου προσδιορίζεται βάσει της υπολογιζόμενης ετήσιας κατανάλωσης ενέργειας για την κάλυψη των αναγκών που συνδέονται με τη χρήση του ώστε να επιτυγχάνονται συνθήκες θερμικής και οπτικής άνεσης.			

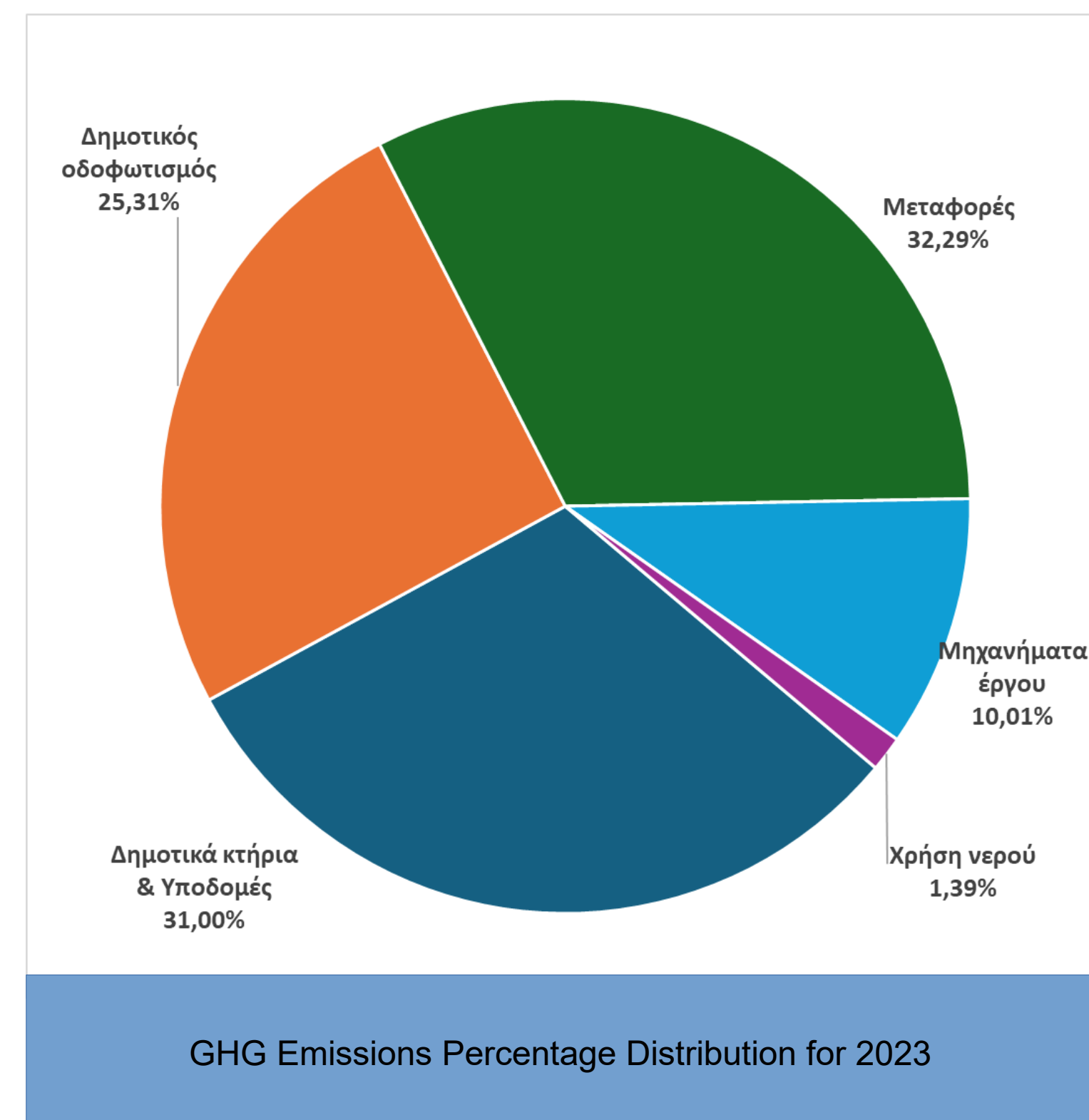
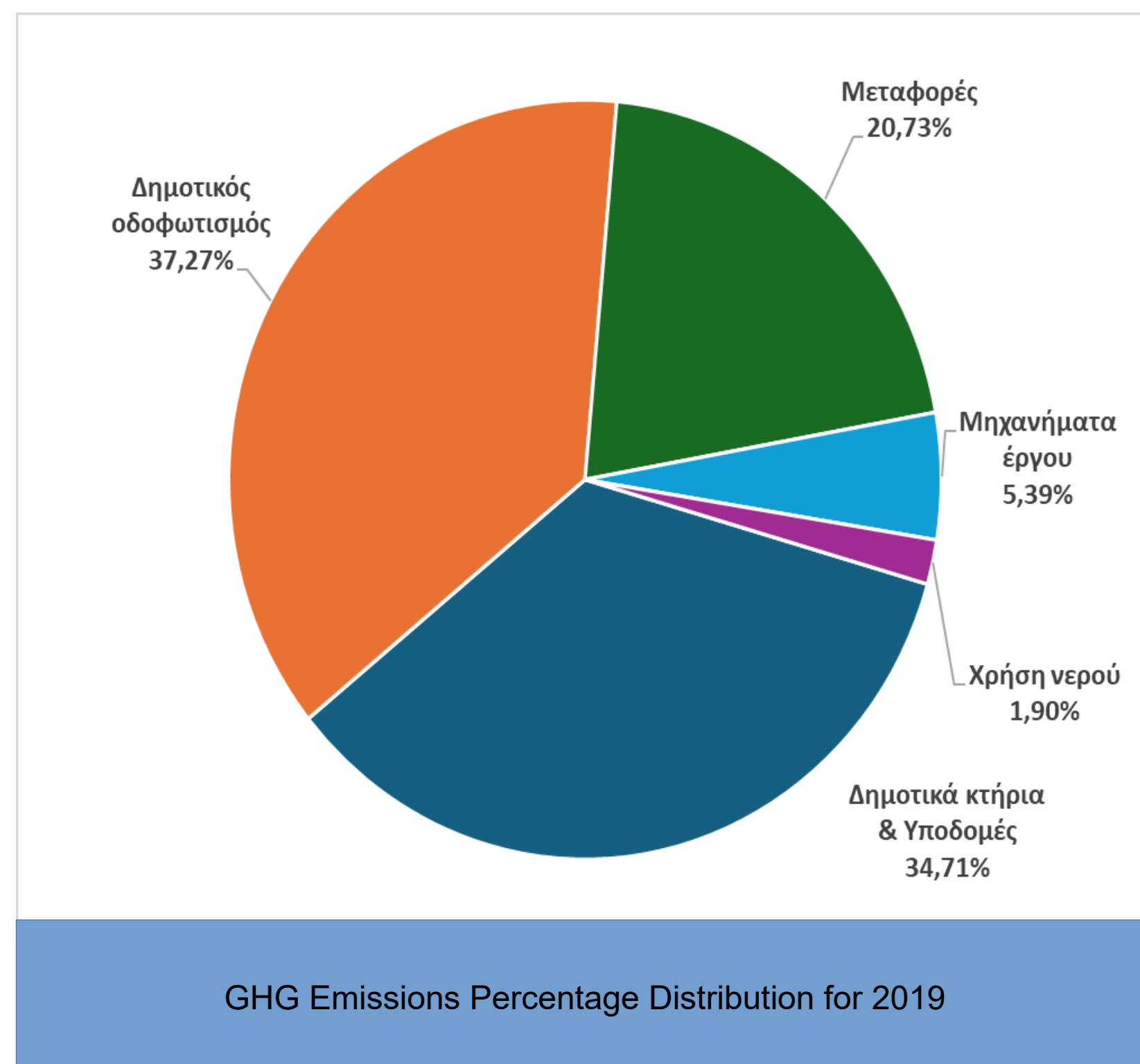
Municipal Emissions Reduction Plan

- In compliance with current regulatory framework, Municipality has set a target of 10% reduction in GreenHouse Gas emissions (measuring period 2019 to 2025).
- Measures taken so far have led to a 20% Reduction in GHG. emissions at municipal buildings and infrastructure.
- 40% reduction in municipal street-lighting sector.
- 33% reduction in water use.



GHG Emissions per Sector: Period 2019 & 2023

- Percentage reduction into Municipality's total carbon footprint measuring the years 2019 and 2023 is 8.92%.
- This is due to the importance of targeted interventions in the sectors of lighting, buildings and rational use of water.
- The increase of GHG emissions in the transport sector and machineries is due to the increase of municipal fleet and number of machines.



Long-term goals for 2030

- Municipality seeks an overall reduction in emissions by 30.05% (National Climate Law 4936/2022).
- Based on the results and the progress in reducing emissions identified in 2023: future targets for 2030:
 - a 26.22% reduction in GHG emissions in the municipal buildings and infrastructure,
 - b 11.08% reduction in the street- lighting sector,
 - c 25.97% reduction in the transport sector
 - d 37.92% reduction in the construction machinery sector
 - e 10.38% reduction in water use.



Municipal Climate Change Mitigation Sum Up Plan

- Promotion of Hybrid Energy Systems.
- LED Lights Replacing Old Lighting Systems.
- Installation of PVs.
- Real Time Control besides Corrective Actions once the Energy Threshold is exceeded.
- Overall Reduction in Energy Consumption and Fossil Fuel Use.
- Future Investment in solar cooling technology.



09:38 4G+ 27%

Plants Statistics

Setup wizard Invite User

1 All 1 Normal 0 Faulty 0 Offline

Enter a plant name



Dimarchio Varis

Normal

Greece Βάρη-Βούλα-Βουλιαγμένη 166 72, ΕλλάδαΤριπτολέμου 55

0.000 kWp 6.64 kWh

No more data.

VS

Home Maintenance Devices Services Me

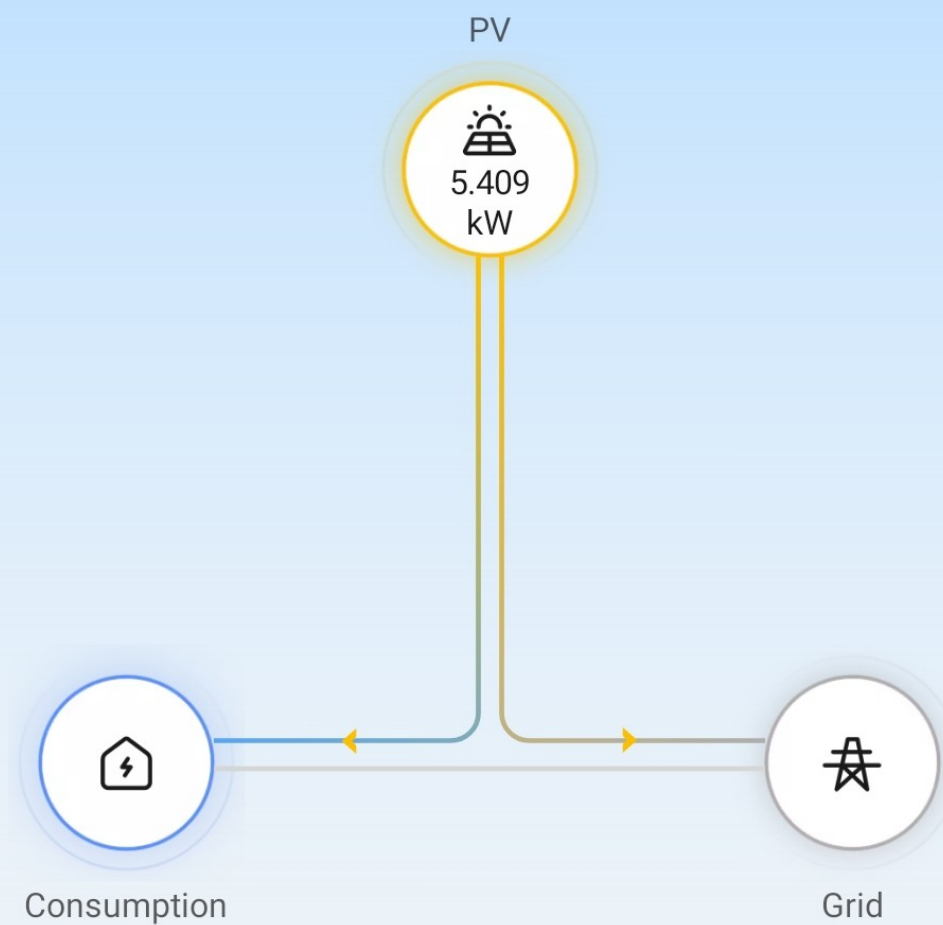
Real Time Monitoring

09:37 4G+ 26%

Dimarchio Varis

Weather -- Plant details >

Normal



6.64 kWh
Yield today

CN ¥ 1.33
Revenue today

1.68 MWh
Yield this month

1.68 MWh
Yield this year

1.68 MWh
Total yield

Overview Statistics Devices

09:38 4G+ 26%

Dimarchio Varis

Day Month Year Lifetime

< 28/05/2024 >

Energy Management

Yield ⓘ
6.64 kWh



Revenue

Set Electricity Prices

Total revenue ⓘ
CN ¥ 1.33



09:38 4G+ 27%

Dimarchio Varis

Day Month Year Lifetime

< 27/05/2024 >

Energy Management

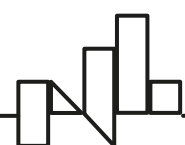
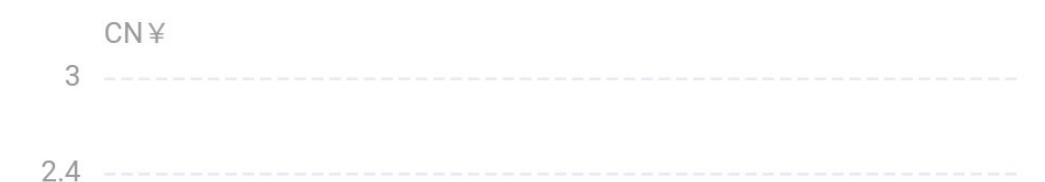
Yield ⓘ
81.91 kWh



Revenue

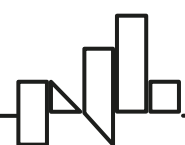
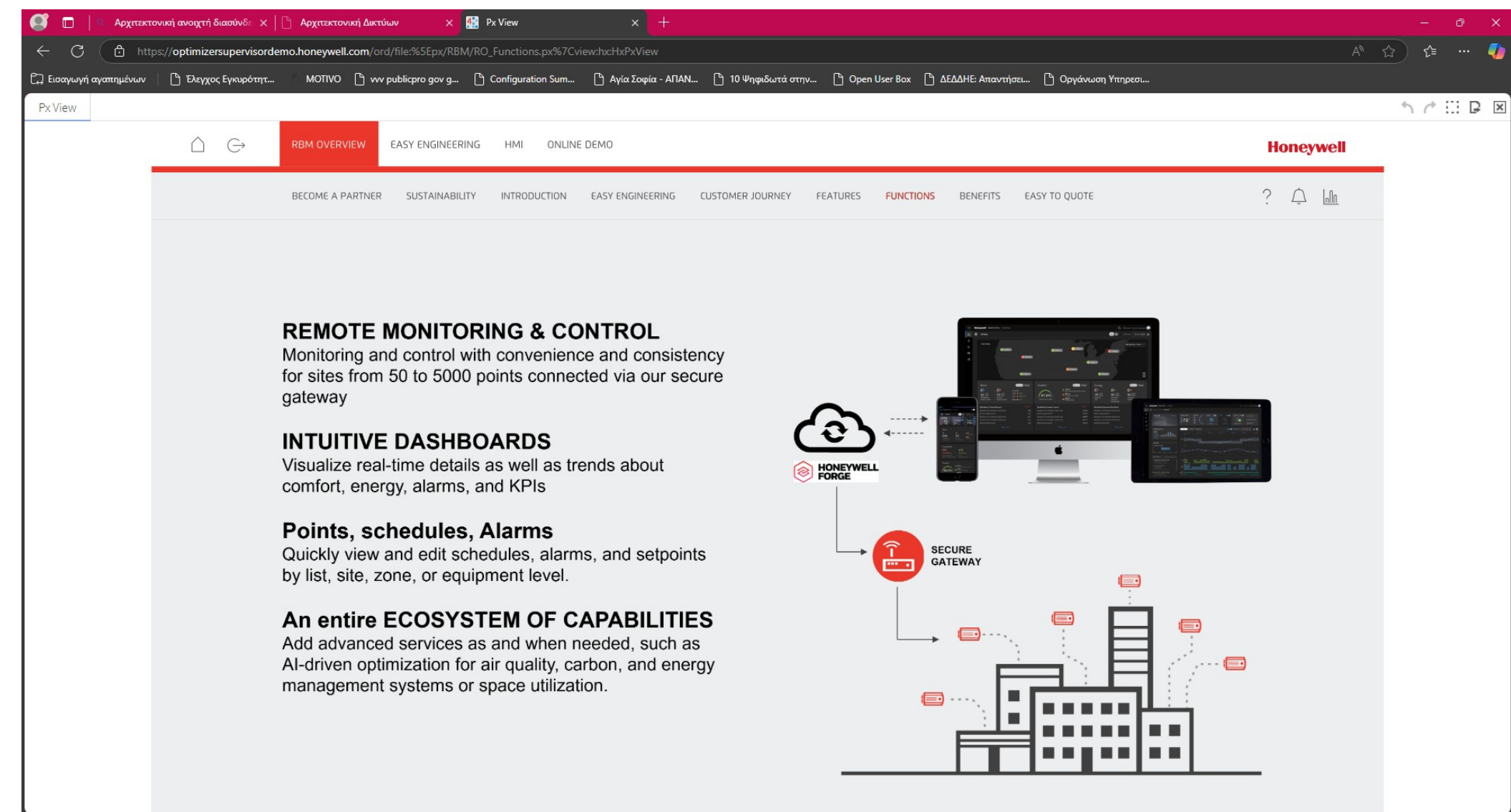
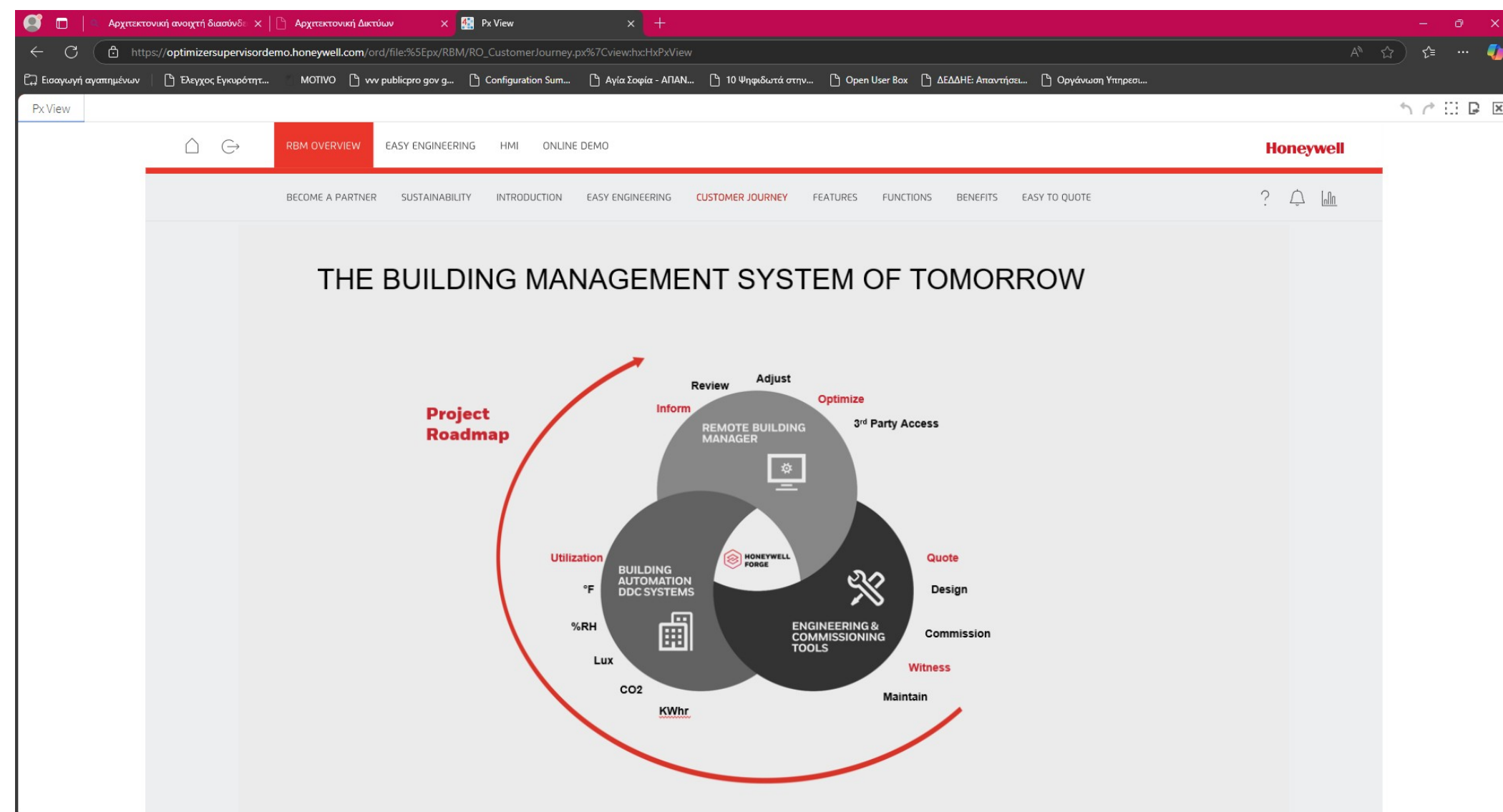
Set Electricity Prices

Total revenue ⓘ
CN ¥ 16.37



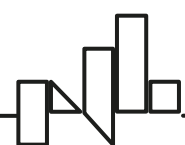
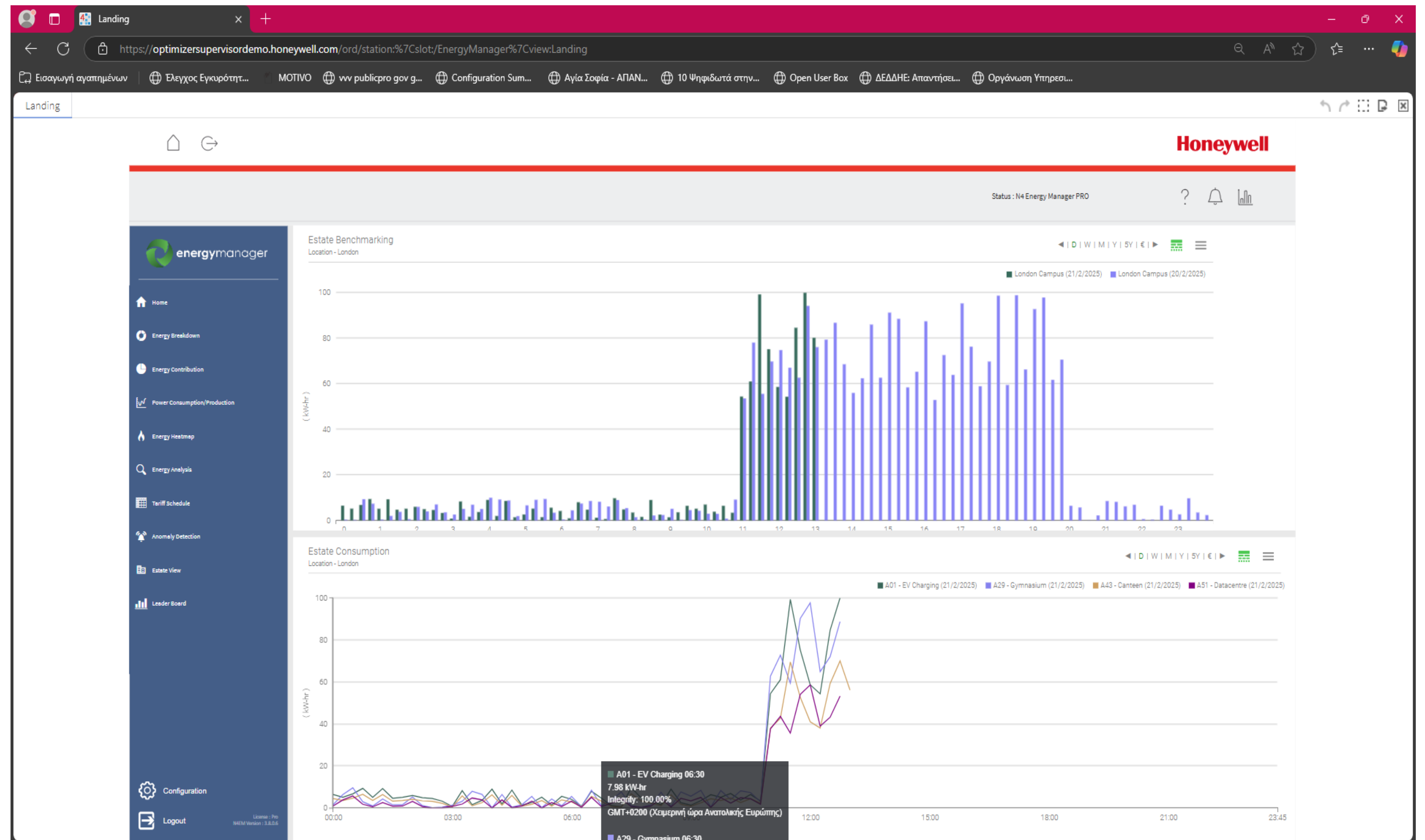
Building Energy Management Systems (BEMS)

- Surveillance and Automatic Control of EM Equipment.
- Basic parameter setting and data analysis from a central control station.



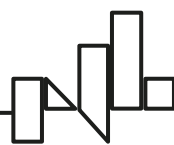
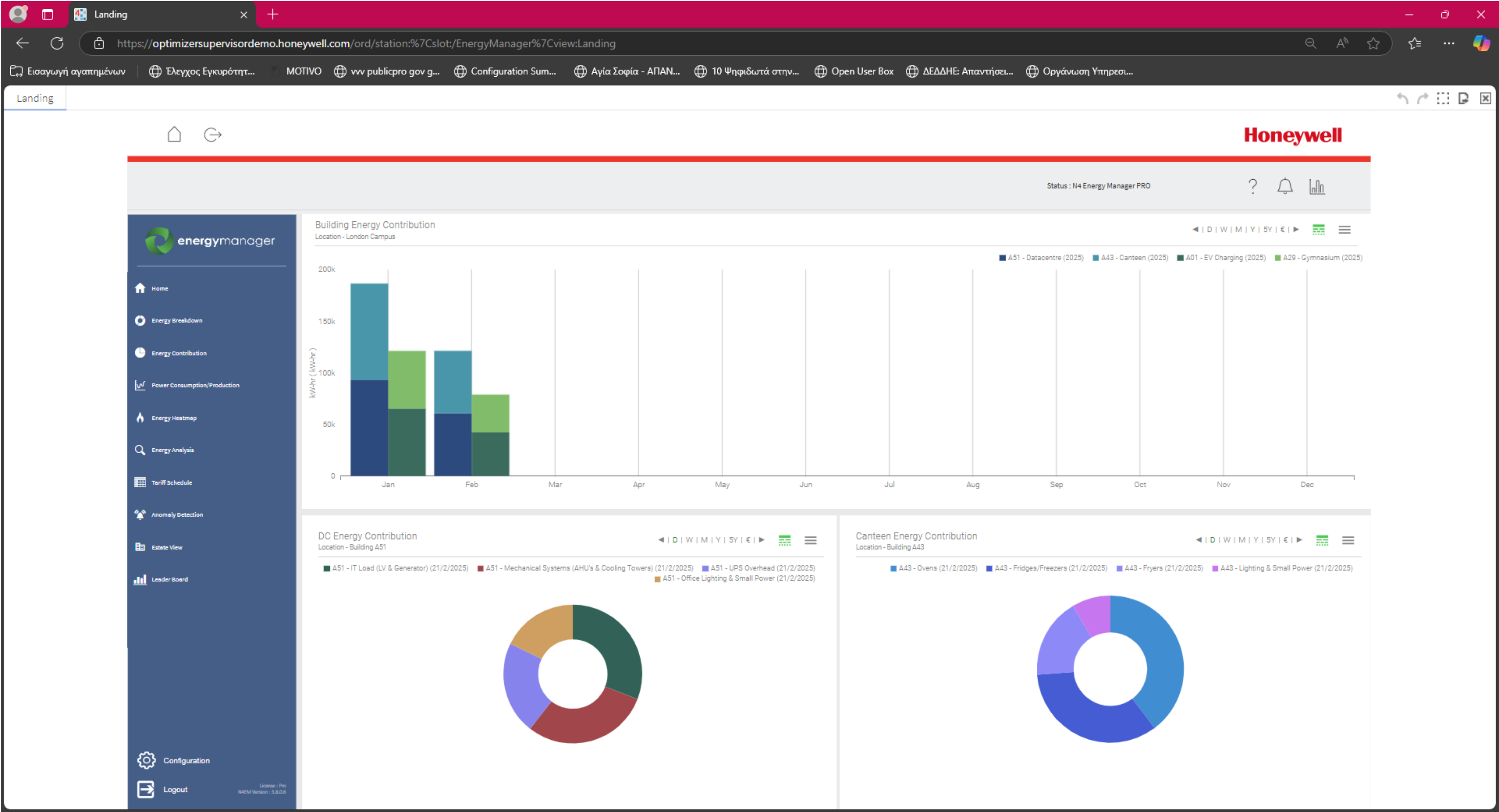
Energy Benchmarking

- Energy Distribution
- Energy Production/Consumption
- Energy Analytics
- Performance Control



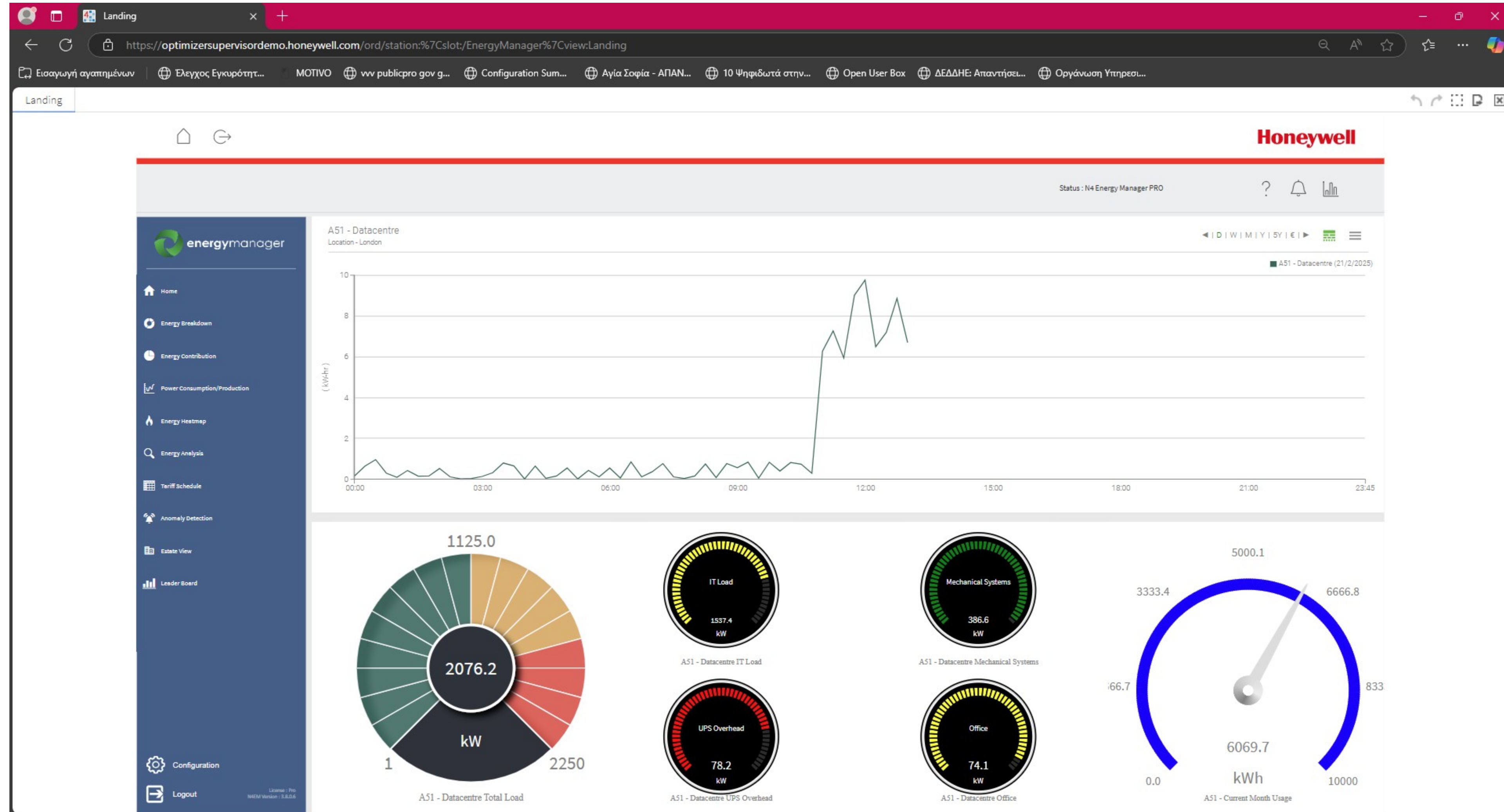
Energy Contribution

Load Distribution per Consumer



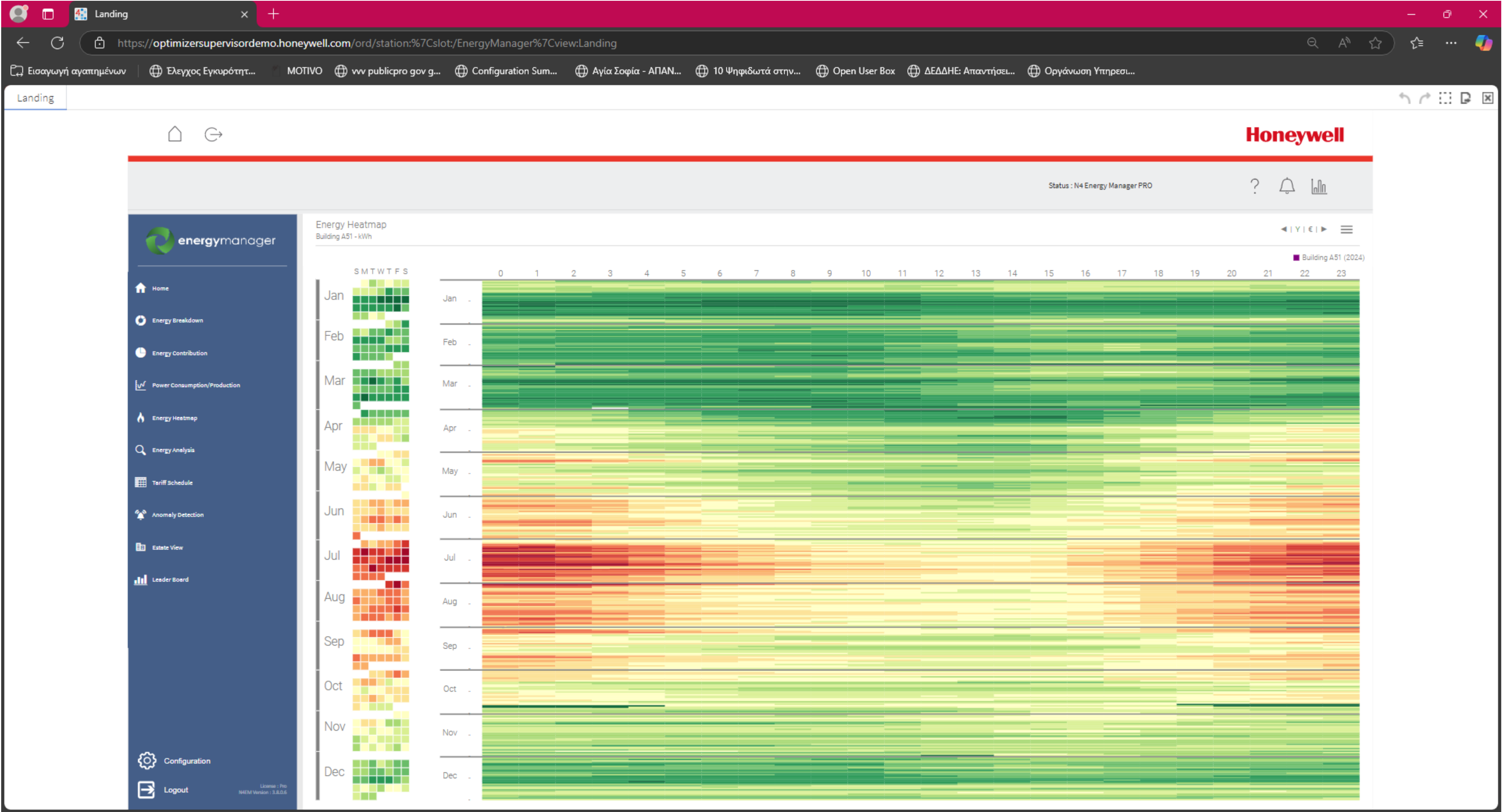
Power Consumption- Data Center

Consumption analysis per load



Energy HeatMap

Load correspondence
with outdoor
temperature.



**Thank you for
your attention.**

**Dr. Miltiadis Kavrakos
Mechanical Engineer
Director of Climate
Change Unit.**

**Dr. Maria
Tsarmpopoulou
Electrical Engineer
MSc, Head of Energy
Transition Department
Climate Change
Division.**

**Municipality of Vari
Voula Vouliagmeni.**

