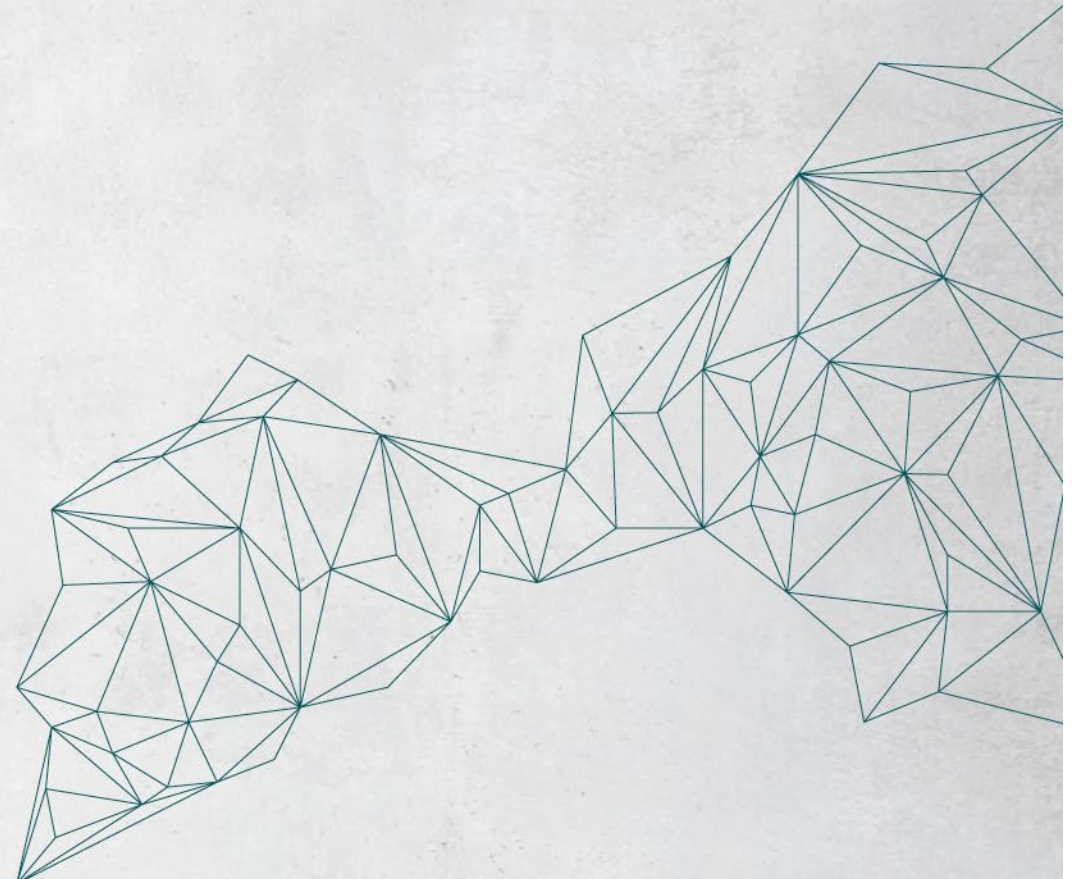


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Supervision

3 simple steps to reduce the environmental and financial impact of refrigeration through IoT

10/10/24

Marion Lazzarotto



On the menu

- 1 | Who are we?
- 2 | Market situation and issues
- 3 | Impacts
- 4 | 3-step action plan



Hall 7 / Booth Number 7-422

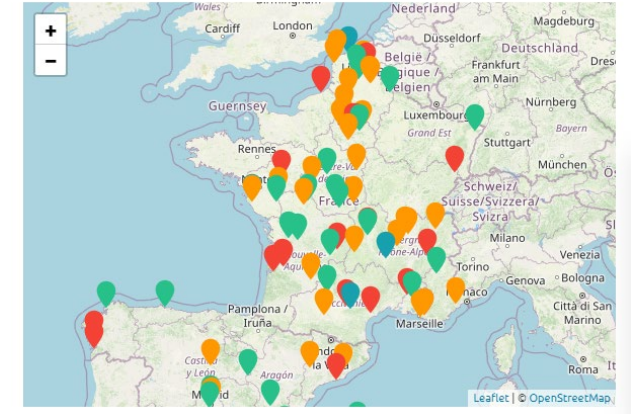
Who are we?

Manufacturer of supervision solutions for refrigeration

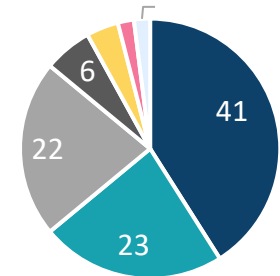
- Continuous monitoring
- Simplifies the management of refrigeration installations and reduces financial and environmental impacts

Key figures :

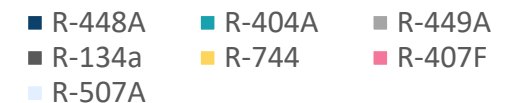
- 890 tons of refrigerant under supervision
- 2500+ installations connected to the supervision platform
- 80% refrigerant savings through early automatic leak detection
- 20% energy savings



PolarVisor supervision



Refrigerant bank monitored



Supervision

- **Equipment** : measures and learns the real operation of installations. All refrigerants, new or existing installations.
- **Web platform** : provides remote visibility, alerts and simplifies multiple installations management.
- **Support** : optimise and improve performance.



Market situation and impacts



CFC - HCFC - HFC
HFO - NH3 - CO2

?



Commercial refrigeration – market situation

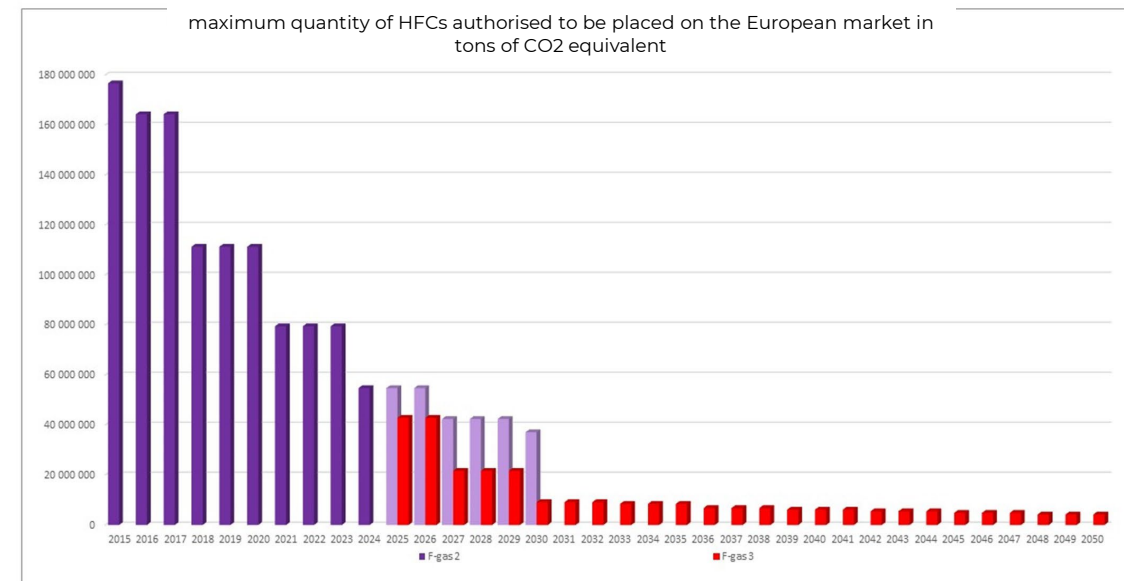
F-Gas 2024: tensions over refrigerants

- Further reduction in HFC quotas on the market
- Product availability issues, additional -22% by 2025
- Price rises
- Complex management for operators

Leak testing requirements :

- Obligation to set up a permanent leak detection system from 500 tonnes of CO₂ eq. for HFCs or 100 kg of HFOs

F-Gas II and III: quotas

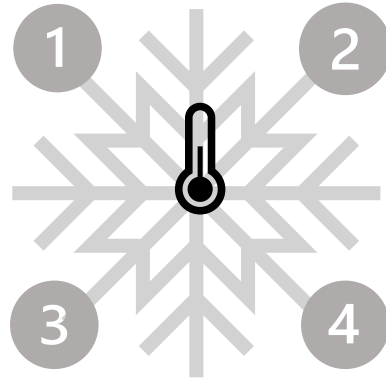


[Summary of regulations and leak detection methods](#)

Commercial refrigeration – market situation

Leaky installations

- Average annual leakage rate (AFCE 2022)
 - hypermarket: 25%.
 - Supermarket: 20% discount
- Underloaded installations



Low visibility :

- On the actual operation of the facilities
- On the quantities of refrigerant charged
- Planning and priorities

High energy consumption

- 50% of a supermarket's final bill
- Little control and optimisation

A lack of manpower

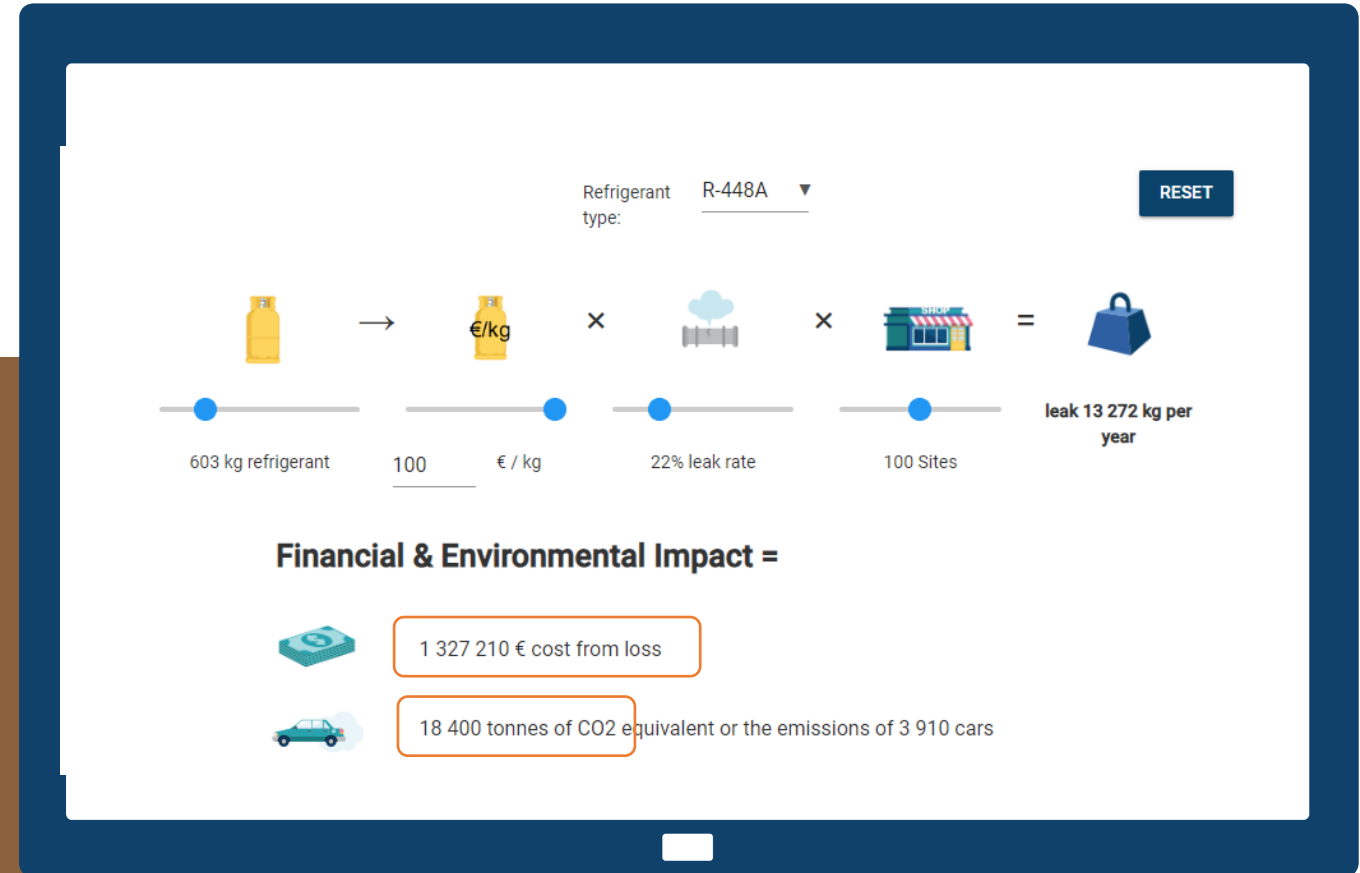
- In a rapidly expanding market
- A complex daily life
- Demanding regulations

Impact of leaks : direct emissions

www.matelex.com/en/solutions/impact-simulator/

Impacts :

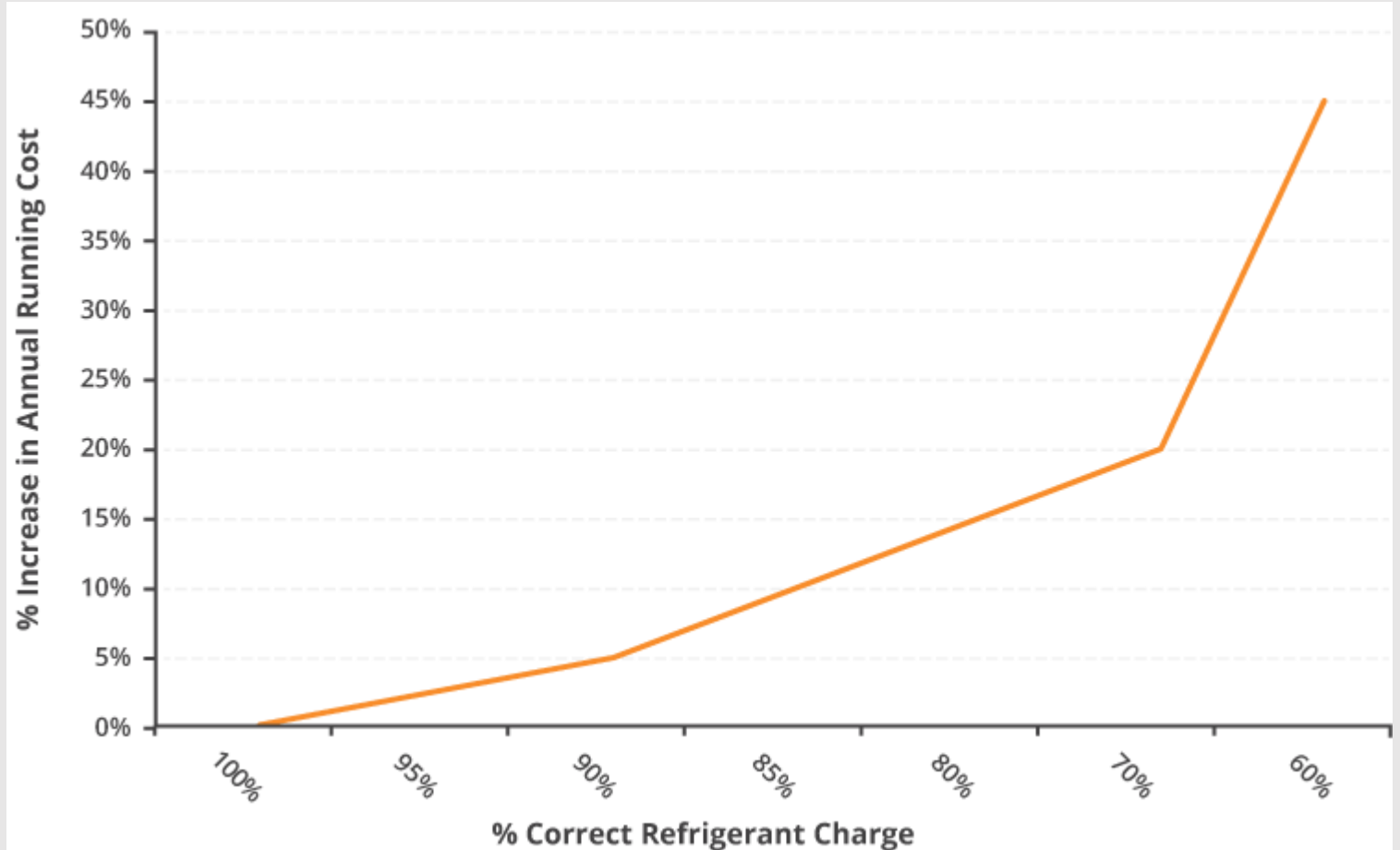
- Direct GHG emissions
- Production stoppages
- Operating losses
- Material breakage
- Health risk, image risk
- Shop closure...



The impact of leaks: indirect emissions

Refrigeration accounts for up to 50% of a retailer consumption:

- Average load on 2000+ installations: 20% of the liquid tank
- Underloaded installations consume more
- Significant impact on the COP, compressor operation..
- You have to measure and understand to optimise



3 steps



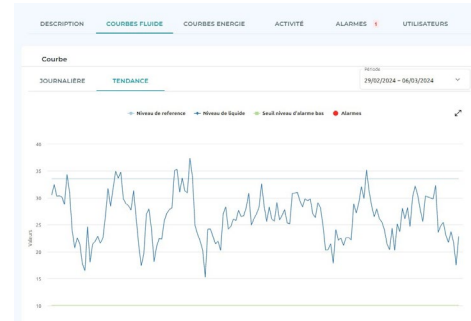
A 3 steps approach

Measure



- Realtime operation, pressures, temperatures...
- Refrigerant level variations
- [PolarBox](#) IoT
- [Energy](#) Module

Analyse



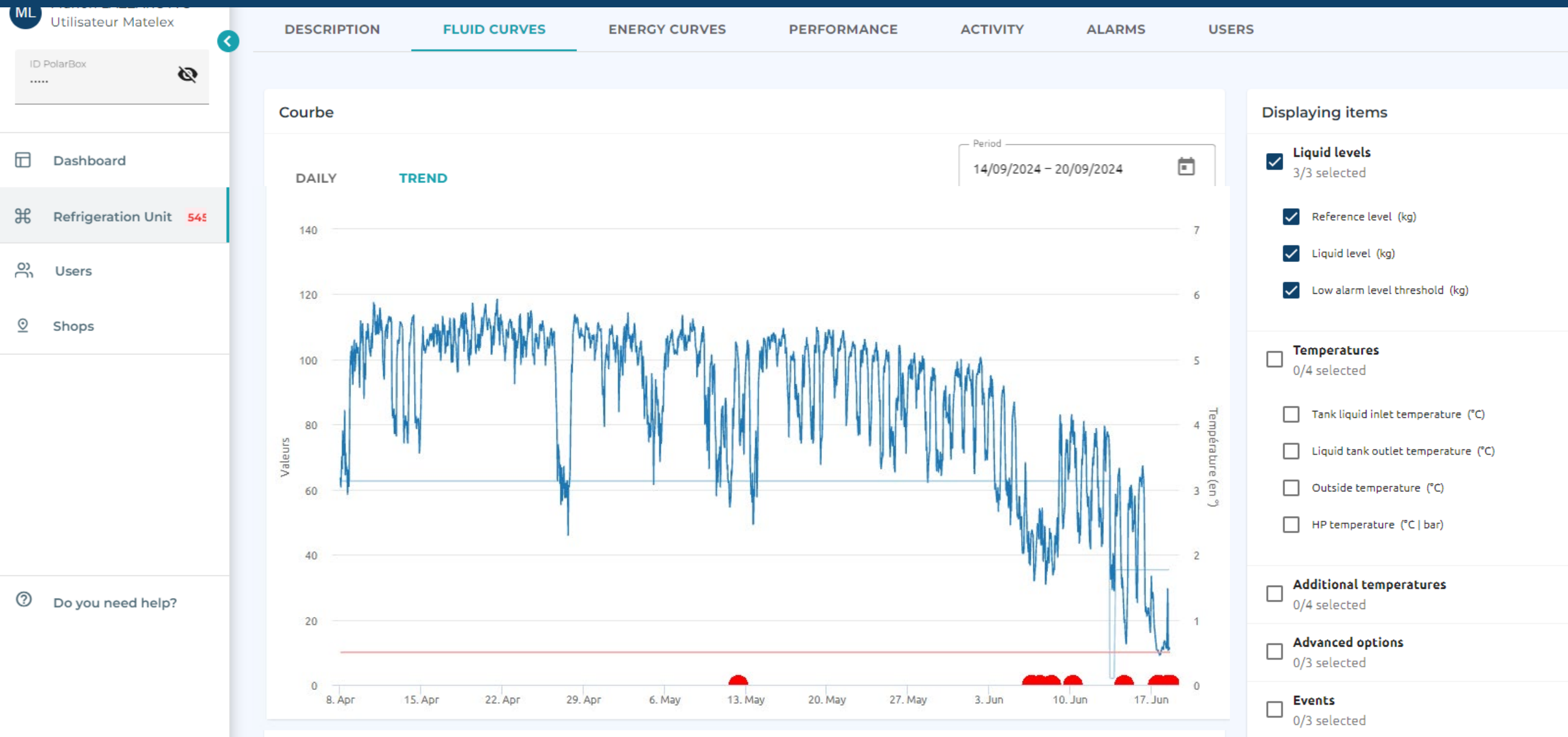
- Data to learn and set reference levels
- Leaks + low level alerts
- Centralised remote monitoring for all sites
- [PolarVisor](#) supervision
- Expert reports

Optimise



- A proactive approach
- With transparency
- Adapted to reality
- Training
- Simplification
- Support

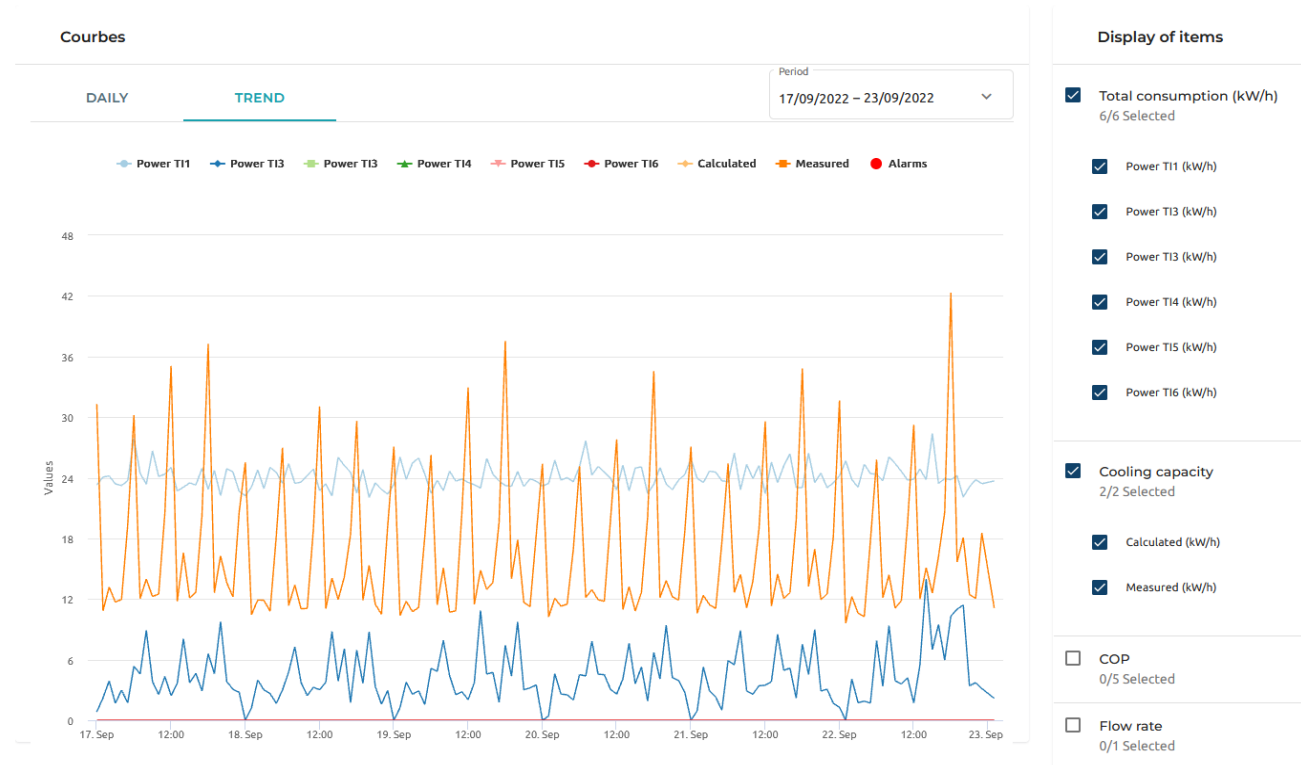
Measure: refrigerant levels



Measure: energy consumption

Regaining control :

- Energy consumption by engine (compressors, condenser, pumps...)
- Alerts in the event of an energy drift
- Real COP monitoring, efficiency of cold production
- Compressor monitoring: short cycles
- Advice to improve settings + check the impact of new settings



Analyse: centralized remote monitoring

Prioritising and preparing interventions

- A single dashboard for all sites
- List and map of alarm installations
- Access to detailed plant information (refrigerant level, energy)
- Remote actions: settings, parameters, sensivity of leak detection
- No unnecessary travel
- Well-prepared interventions

The screenshot displays the PolarVisor PRO dashboard interface. On the left, a sidebar menu includes options like 'Dashboard', 'Refrigeration Unit' (with a red indicator '546'), 'Users', 'Shops', 'Gestion des devices', 'Installeurs', 'Chaînes d'installateurs', 'Administration', and 'Do you need help?'. The main content area is titled 'Dashboard' and features a 'List of active alarms (862)'. This list contains several entries with status icons (red triangles or circles) and details:

Alarm Name	Location	Category	Details
Supermarket 1	Centrale Négative	technical	HP pressure sensor fault
Paris Facility	DNI Support	statistical	Statistical leak alarm
Nuremberg big shop	CRF MURCIA INFANTE – CENTRAL BT	technical	Outdoor temperature sensor fault
Lyon retailer 2	Centrale positive +	low level	Low level alarm
Cold storage site 3	Centrale Négative	low level	Low level alarm
Vaccine storage	Centrale Positive 1	low level	Low level alarm
Brewery 6	Chiller 2 Compresseur N°1	statistical	Statistical leak alarm
Madrid store	Centrale Negativa N°1 Aluche	low level	Low level alarm
Retailer center	Centrale Positive 1	low level	Low level alarm
Fresh supermarket	Centrale Négative 1	statistical	Statistical leak alarm

To the right of the alarm list is a 'Map of alarm equipment' showing a map of Europe with red location pins indicating the sites of the alarms.

Optimize: installations management

Towards proactive management: coping with shortages and preserving resources

- Identify priority sites and equip them with a supervision solution
 - Involve the final user or refrigeration specialist in the process
 - Stop looking for non-existent leaks
 - Take action when a leak is reported
 - Optimise the fluid load, anticipate regulatory changes by knowing the bank loaded in the installations
 - Systematically connect to PolarVisor to be alerted, and trigger the right intervention at the right time
- Secure cold production and strive for performance



Results



Case study :

- **6 systems monitored in 4 shops**
- 6-month study
- Refrigerant : R404A
- Comparison of technicians reactivity vs PolarBox continuous monitoring

On average

79% in fluid savings

With detection 60 days earlier

Shop	Installation	Sales area (m²)	Tank capacity (l)	Total quantity of refrigerant (kg)	Leakage rate (kg/day)	Refrigerant that could have been saved	(%) Savings	Number of days required for the technician to detect the leak	Number of days for detection by algorithm	Number of days saved
1	+	9000	400	850	41,7	208	83%	6	1	5
2	+	9000	2*250	900	5,7	143	71%	35	10	25
2	-	9000	145	225	0,2	24	79%	131	28	103
3	-	9600	220	350	No leaks	No leaks		No leaks	No leaks	
4	+	9600	145	210	2	97	83%	59	10	49
4	-	1400	145	350	No recharging	No recharging		164	45	119
-						Averages	79%			60.2

4 areas of savings

80% refrigerant savings



- 24/7 surveillance
- Email alerts in the event of a leak, loss estimates
- Historical contour lines
- Full logbook
- Centralised remote monitoring

20% energy savings



- Alerts on energy drifts
- Adequate load to reduce consumptions
- Actual COP calculation
- Compressor failure warning
- Help with optimising and checking settings

Regulatory compliance



- F-Gas compliance on leak detection
- No more unnecessary leak detection
- Acting at the right time
- Extended installation life
- Anticipation thanks to refrigerant bank monitoring

Simplified management



- Dashboard to trigger the right action at the right time
- Avoids unnecessary travel
- Better preparation for onsite interventions
- Transparency between operators and owners

Thank you

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