



Final Dissemination Event

6 July 2023
Brussels, Belgium

RINA CSM was in charge of the project KPIs Monitoring activities

1. Definition of KPIs and validation of methodology for calculation

Following KPIs were defined for the monitoring of project outcomes

- Energy Renewable Production is the total quantity of energy produced. This KPI should provide an indication of the total Energy Consumption per year reduction due to the project. [MWh/year]
- CO2 emission saved from LHP and Gex [tCO2/year]

2. Design, implementation and on-line installation of the Web Monitoring Platform

Methodology for calculation of saved CO₂

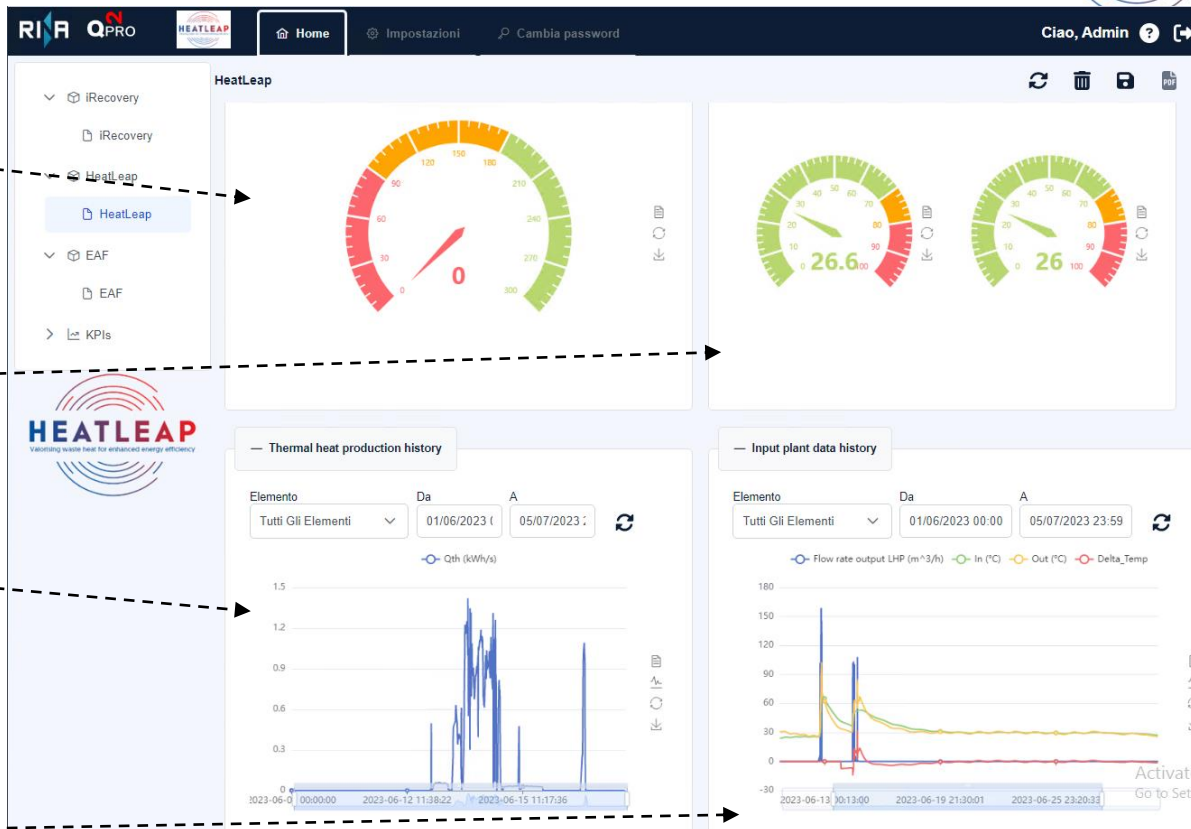
LHP → The CO₂ emission saved from the production of ***thermal energy*** by the LHP is the CO₂ generated by the production of the same amount of heat energy by means of fossil (natural gas methane) combustion

To calculate this KPI it is needed the emission factors for fuels related to net calorific value (NCV) from the official gazette of the European union. For the methane is 54.9 (tCO₂/TJ). Beside to calculate the amount of methane needed to produce the same quantity of heat we need also the yield of the hot water boiler with insulation that operate in the similar range of temperature (70 → 90°C) that is of about 96.5%.

Gex → The CO₂ emission saved from the production of ***electrical energy*** by Gex is the CO₂ generated for the production of the same amount of electricity produced by the national distribution network

To calculate this value it is necessary to know the “Greenhouse gas emission intensity of electricity generation”. The value of the “GHG intensity” is available on the European Environment Agency website and for the Italy is 233 g CO₂e/kWh

MONITORING WEB APPLICATION



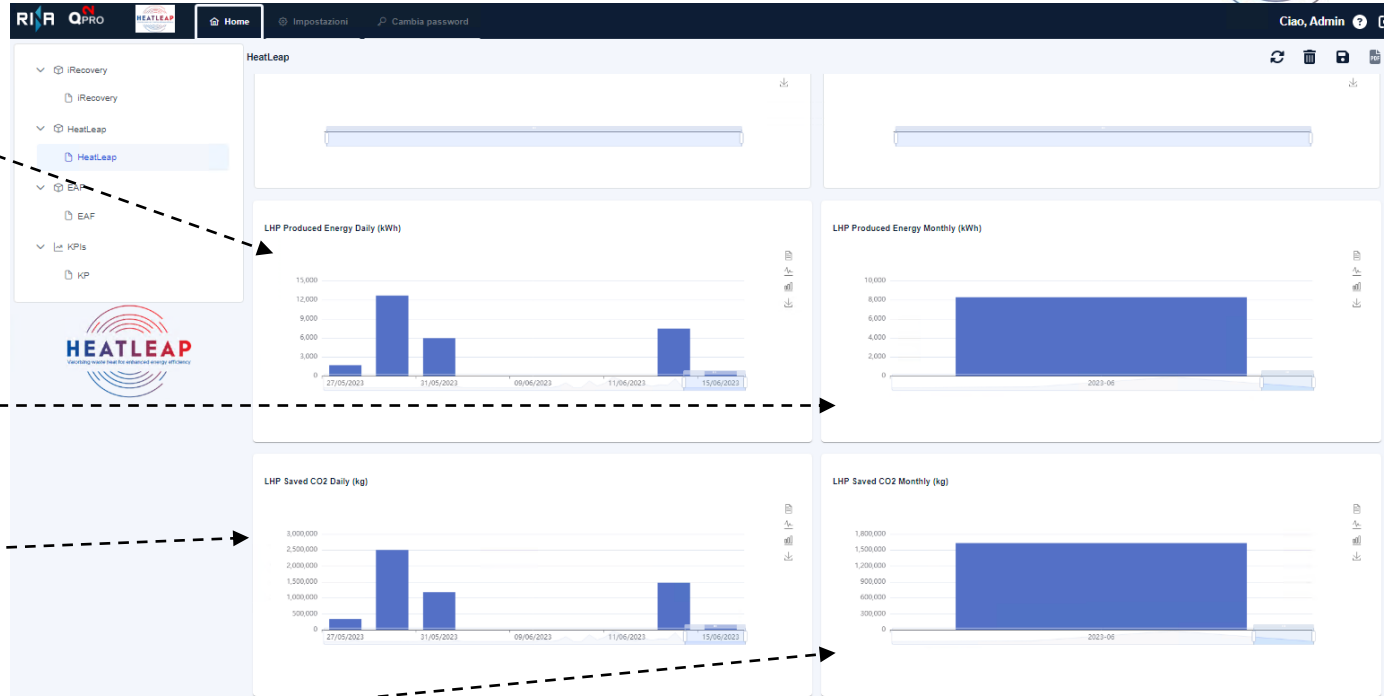
Real Time Heat production [W]

Real Time In / Out Temperatures

History of Heat production

History of plant parameters

MONITORING WEB APPLICATION



Daily Heat production within the select period [kWh]

Monthly Heat production within the select period [kWh]

Daily Heat saved CO2 within the select period [kg]

Monthly Heat saved CO2 within the select period [kg]

MONITORING WEB APPLICATION

Navigation Menu:

- iRecovery (highlighted)
- HeatLeap
- EAF
- KPIs

Segnali (Signals) Table:

Machine status	collettore vapore locale iRecovery	scambiatore 1	scambiatore 2
90NDB51_CF001+90NDB52_CF001	collettore locale A2A	scambiatore 1	scambiatore 2
0	0	-0	-0
temp.vap.acc. 218.63	H_AI_FT_90LAB30_CF001_HMI_Value -0	H_AI_TT_90LAB30_CT001_HMI_Value 25	H_AI_PT_90LAB30_CP001_HMI_Value 1
H_AI_TT_90NDB51_2_CT001_HMI_Value 58			

Storico segnali (Historical signals) Legend:

- 90NDB51_CF001+90NDB52_CF001
- collettore locale A2A
- collettore vapore locale iRecovery
- scambiatore 1
- scambiatore 2
- temp.vap.acc.

temp.vap.acc. Gauge: 218.63

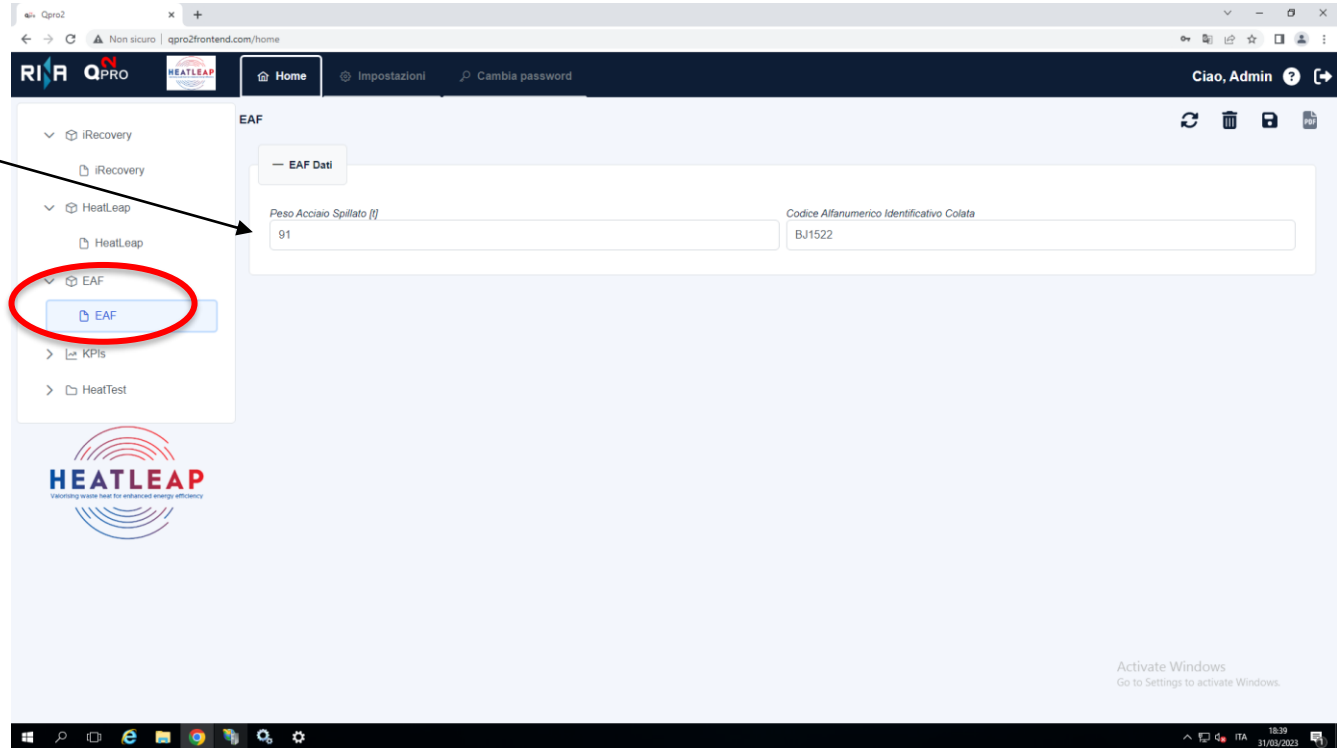
Real time Data monitoring

Tempertaure of heat recovered from EAF

Historic Data monitoring (Heat temperature)

MONITORING WEB APPLICATION

EAF Last Heat Data monitoring



The screenshot displays the EAF monitoring interface. The browser window title is 'gpro2'. The address bar shows 'gpro2frontend.com/home'. The navigation bar includes 'Home', 'Impostazioni', and 'Cambia password'. The user is logged in as 'Ciao, Admin'. The left sidebar shows a tree view with 'EAF' selected and highlighted in red. The main content area shows 'EAF' data entry fields for 'Peso Acciaio Spillato [t]' (value: 91) and 'Codice Alfanumerico Identificativo Colata' (value: BJ1522). The HEATLEAP logo is visible at the bottom left of the page content.

MONITORING WEB APPLICATION – Configuration



Qpro2

Non sicuro | heatleapmonitor.com/settings

Home Impostazioni Cambia password

- Gestione Entità
 - Configura
- Gestione Gruppi - Utenti
 - Utenti
 - Gruppi
 - Stati - Autorizzazioni

Configuration of application users and entities (Administrator)

Home Impostazioni Cambia password Ciao, Admin

Clear Search keyword

Gruppo	Numero di attributi	Attributi per riga
LHP Produced Energy Daily (kWh)	0	1
LHP Saved CO2 Daily (kg)	0	
LHP Produced Energy Monthly (kWh)	0	
LHP Saved CO2 Monthly (kg)	0	

Da 1 A 5 Di 5 trovati

Nome: LHP Saved CO2 Daily (kg)

Layout gruppo: Query

Tipo margini: Mostra bordi e label gruppo

Stile gruppo: Larghezza: 100%

Attributi per riga:

Altezza: 300

Visualizzazione: Grafico-Bar

DBMS: SqlServer

Stringa di connessione: Server=TASRV-ORI-HL; Database=QPRO2DB; User id=mluser; Password=\$123456789; MultipleActiveResultSets=true

Query:

- Valore Attributo -> @NomeAttributo
- Id Attributo -> @NomeAttributo_numid
- Id Istanza -> @InstanceCatalogueNumid

```
select CONVERT(date,ATTRIBUTE_HISTORY CREATION_DATETIME),
SUM(ATTRIBUTE_HISTORY.NUMBER_VALUE)*30*3.6*0.0549 from
INSTANCE_ATTRIBUTE inner join ENTITY_ATTRIBUTE on
INSTANCE_ATTRIBUTE.ENTITY_ATTRIBUTE_NUM_ID=ENTITY_ATTRIBUTE.ENT
TY_ATTRIBUTE_NUM_ID inner join
QPRO2DB_HISTORY.sbo-ATTRIBUTE_HISTORY
on
INSTANCE_ATTRIBUTE.INSTANCE_ATTRIBUTE_NUM_ID=ATTRIBUTE_HISTORY.
INSTANCE_ATTRIBUTE_NUM_ID
where ENTITY_ATTRIBUTE_NAME=QTH' group by
CONVERT(date,ATTRIBUTE_HISTORY CREATION_DATETIME) order by
CONVERT(date,ATTRIBUTE_HISTORY CREATION_DATETIME)
```

Intervallo (ms) timer automazione (campo vuoto o 0 per disattivare)

Colore sfondo

KPI definition (Administrator)

Conclusions

The HeatLeap project has given RINA-CSM the opportunity to develop a flexible and configurable platform for monitoring environmental performance.

The platform allows to define KPIs directly from the user interface, view them in real time and log them in a database. This allows both the visualization of historical data and their subsequent processing, for example using data analysis algorithms (data mining)

It can be installed **on-premises** on the plant or in **cloud**, allowing it to be used “as-a-service” mode



Address One, Address Two, City, 12345 • info@heatleap.com

www.heatleap.com