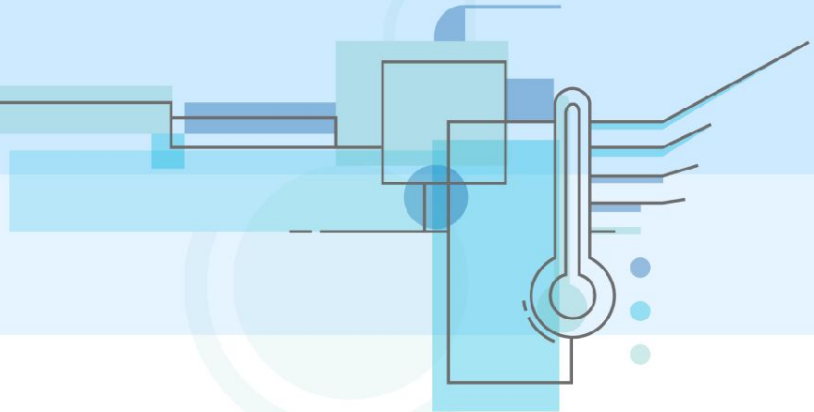
The Role of Heat Pumps among Energy, Finance, and AI

M. Dall'Ombra |Assoclima

National Workshop on Heat Pumping Technologies - ENEA

Pisa, 2026 november 17th



The Role of Heat Pumps among Energy, Finance, and AI

Electricity market and savings

To systematically analyze the **functioning** and **evolution of the electricity market and prices in Italy**

Identify **barriers and regulatory framework that are limiting** the **competitiveness of electricity** compared to fossil fuels, particularly **gas**

Formulate **concrete proposals** to make the **diffusion of heat pumps more sustainable** , efficient and consistent with the country's decarbonisation targets.

Supply chain, investments and finance

Evaluate the **value chain** and the most strategic segments of the heat pump supply chain in Italy, analyzing **risks and barriers** to investment

Identify **financing tools and models** applicable to the HP supply chain

Highlight the **enabling conditions** to strengthen **the investments attractiveness** by **private financial institutions** in addition to the support of public funding

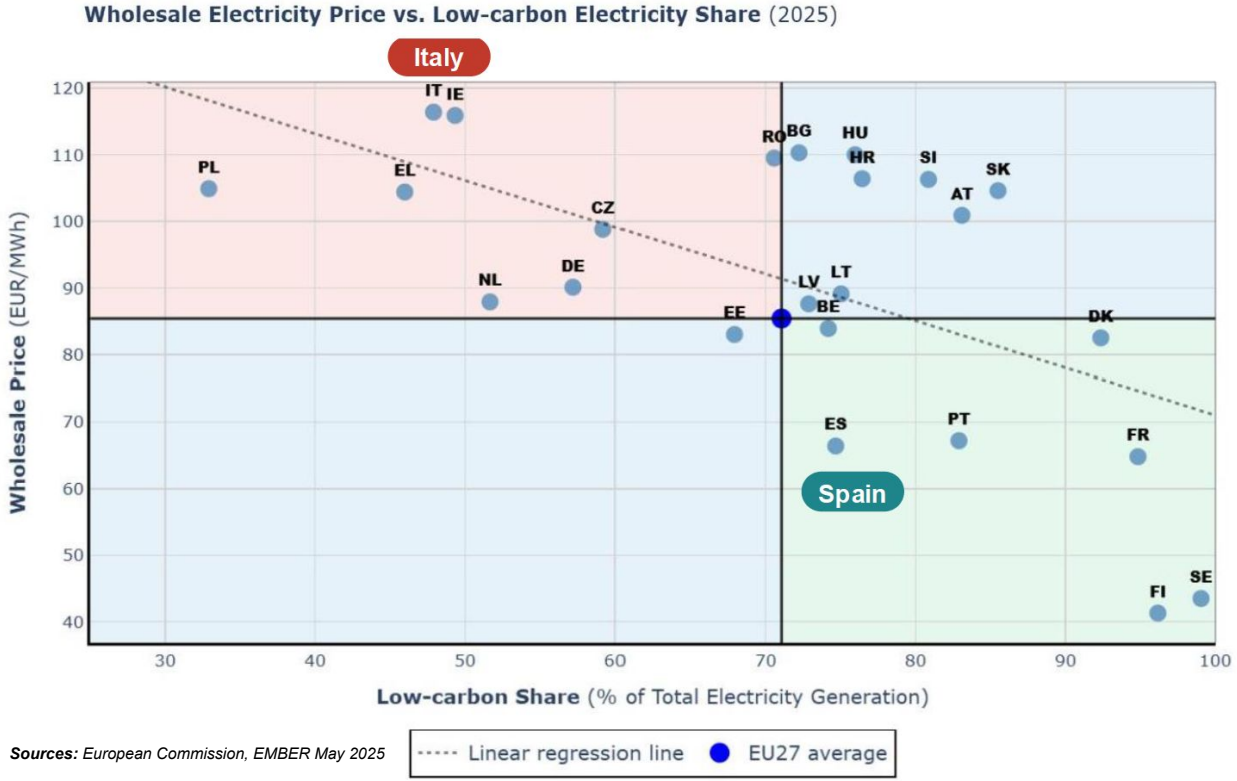
Data, services and digital platforms

Data collection and **sharing** in the **heat pump sector** in the new regulatory, technological and competitive context

Highlight how **heat pumps** no longer represent "only" a heating/cooling technology, but an **intelligent and strategic hub of the energy system**

Evaluate how HPs , through data processing, can **generate value for the whole ecosystem**

1. Electricity market and savings

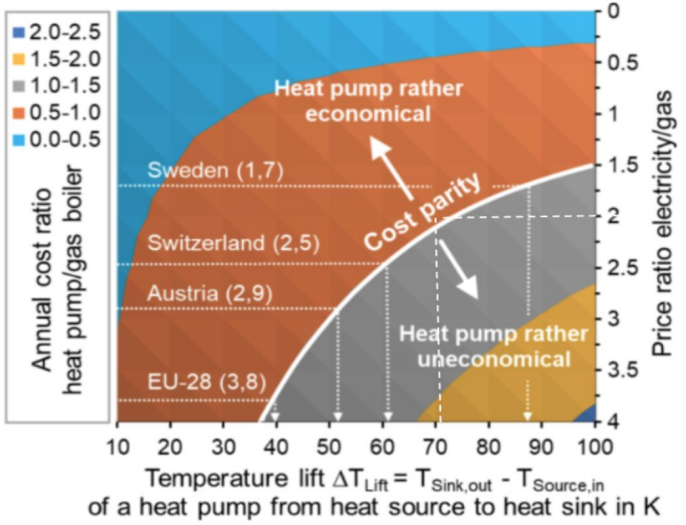


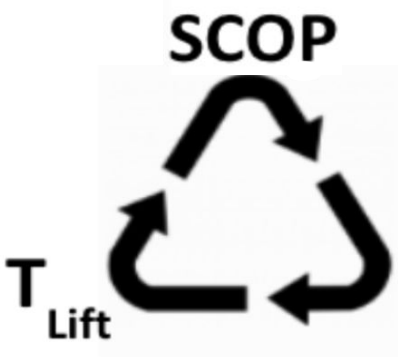
In **Italy where gas sets the price 75% of time**, power prices averaged €115/MWh in May, more than **two times higher than in Spain** (€54/MWh) where gas sets the price **only 9% of time**

Prices in Member States with **high share** of **clean/low carbon** energy have been consistently **among Europe's lowest** (e.g. Nordics, Iberian Peninsula, France)

Sources: *European Commission, EMBER May 2025*

The “triangle” for savings



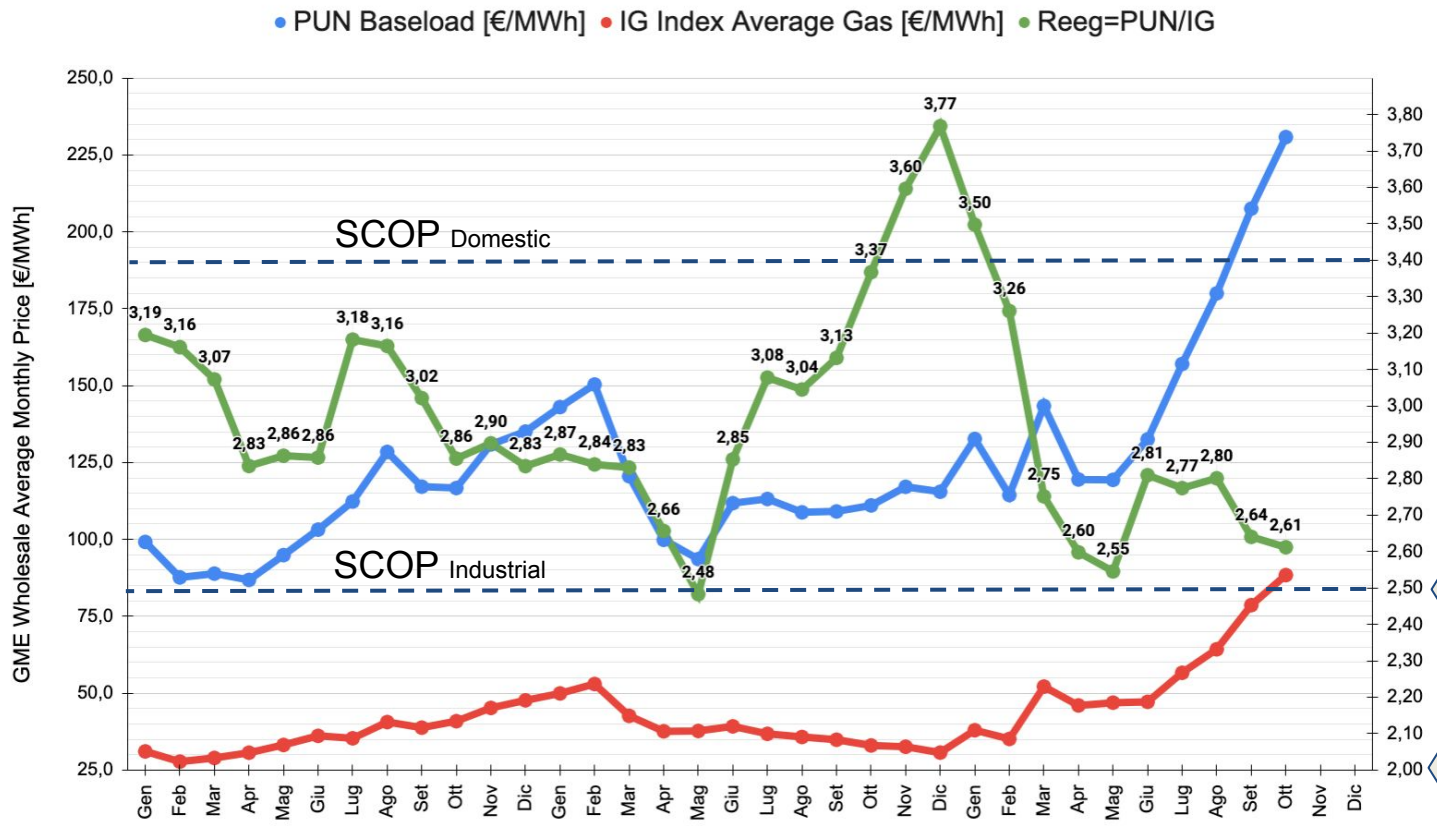


Reeg < SCOP = SAVINGS

$$Reeg = \frac{EE_{€/kWh}}{GAS_{€/kWh}}$$

$$GAS_{€/kWh} = \frac{GAS_{€/m3}}{10}$$

Reeg | trend 2024-2026



Electricity to Gas Ratio (Reeg) targets have been set by EU Commission in the Electricity Action Plan published July 2026

EAP Reeg Domestic Target = 2,5

EAP Reeg Industrial Target = 2,0

2. Supply chain, investments and finance

The HP sector is already **attracting investments** but to scale private capitals flows, more efforts are needed to strengthen the **return on investments.**

Sustainable finance

PdCs fall within the scope of the EU Taxonomy, under certain conditions, both in manufacturing and in interventions on buildings

EU industrial policy

The Net-Zero Industry Act recognizes the strategic role of decarbonization technologies, including heat pumps

The **5 conditions** needed to attract capital

1. **Stability of the regulatory framework** Predictability of demand and investments
2. **Quality of the installation chain** Reliability of performance and economic return
3. **Measurability of energy savings** Ability to transform future benefits into financial flows
4. **Valorization of the property or *asset*** Link investments to the value of the asset served
5. **Financial Aggregation** Overcoming Investment Fragmentation (installer)

The availability of capital and the recognition of HPs as sustainable investments are not enough. **Banks**, **consumer's credit companies** and **investors** are used to evaluate companies, business plans and projects **on the basis of predictable savings, verifiable performance and limited risks.**

3. Data, services and digital platforms

EPBD

Energy performance and integration

Promotes more efficient and intelligent buildings, encouraging the **integration of heat pumps with automation and control systems**

AI Act

Trustworthy Artificial Intelligence

It defines differentiated **requirements** based on the **type and risk** of the ***AI agent*** *in use*

Data Act

Data Access and Governance

Introduces rules for **access and use of data generated by connected products**, with implications for manufacturers and service providers

Cyber Resilience Act

Connected Product Security

cybersecurity **requirements** into the lifecycle of affected digital products

4 key EU legislative acts connecting **energy performance** with **connectivity**, **data management**, **cybersecurity** and **AI** use that will **heavily impacting** the heat pump sector

3. Data, services and digital platforms

The rise of data management with **A**rtificial **I**ntelligence can reduce energy and operating costs, enabling new *business models* along the HVAC supply chain

13-25 % energy bill savings through **IoT/AI device integration** vs. traditional solutions

Reduction in energy use by **20-30%** in commercial HVAC thanks to:
Digital Twin,
Tailored AI agents
24/7 monitoring

Expected **savings** from **AI driven** predictive **maintenance programs:**
Downtime **35-45%**
Breakdown **70-75%**
Maintenance **25-30%**

…….new *business models enabled*……...

HEATING/COOLING as a **SERVICE**

ENERGY PERFORMANCE CONTRACT

ALL INCLUSIVE MAINTENANCE CONTRACT

Source: TEHA "THE FUTURE POSITIONING OF THE HEAT PUMP SECTOR" July 2026

3. Data, services and digital platforms

To deliver the benefits associated to the digitalization of HPs it mandatory to tackle:



Interoperability and shared *standards*

Enable heat pumps to communicate with HEMS, BMS, PV, storage and grids through compatible architectures and interfaces



Enhancement of electrical flexibility

Promote dynamic pricing, *Demand Response* and access to flexibility markets, including through aggregators



Digital skills and security

Strengthen supply chain capabilities in software, AI, data management and *cybersecurity* , with a focus on SMEs

AI Heat Pump Hub

Shared supply chain infrastructure at national level to **promote access** to **digital skills**, **interoperability**, development of **AI solutions and data valorization**, aimed to **support SMEs growth** in an ever increasing competitive market.

ASSOCLIMA
COSTRUTTORI SISTEMI DI CLIMATIZZAZIONE

ENEA
National Italian Workshop on Heat Pumping Technologies
Pisa - November 7th 2026

ANIMA
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The Role of Heat Pumps among Energy, Finance, and AI

THE FUTURE OF HEAT PUMPS BETWEEN COMPETITIVENESS, MARKET AND POLICY

EXECUTIVE SUMMARY 1

CHAPTER 1
INTRODUCTION 2

CHAPTER 2
THE STRATEGIC CONTEXT OF HEAT PUMPS BETWEEN EUROPEAN POLICIES, TARGETS NATIONAL AND ENABLING MEASURES 4

CHAPTER 3
THE DETERMINANTS OF THE ELECTRICITY/GAS PRICE RATIO AND THE EFFECTS ON CONVENIENCE OF HEAT PUMPS 10

CHAPTER 4
THE EVOLUTION OF THE ELECTRICITY MARKET BETWEEN *MARKET DESIGN REFORM*, ENERGY INSTRUMENTS PRICE STABILIZATION AND THE FLEXIBLE ROLE OF HEAT PUMPS 14

CHAPTER 5
ANALYSIS OF THE FINAL PRICE OF ELECTRICITY AND GAS: BREAKDOWN OF THE COMPONENTS AND BILL COMPARISON 19

CHAPTER 6
OPERATIONAL AND *POLICY* PROPOSALS TO REDUCE THE DIFFERENTIAL 25

REFERENCE BIBLIOGRAPHY 29

THE OPPORTUNITIES FOR FINANCIAL ATTRACTIVENESS OF OPERATORS IN THE HEAT PUMP SUPPLY CHAIN

EXECUTIVE SUMMARY 1

CHAPTER 1
SUSTAINABLE FINANCE AND INDUSTRIAL POLICY IN THE HEAT PUMP SUPPLY CHAIN 2

CHAPTER 2
THE STRUCTURE OF THE INDUSTRIAL SECTOR AND PROSPECTS FOR DOMESTIC PRODUCTION IN THE DOMESTIC MARKET AND FOR EXPORTS 6

CHAPTER 3
ANALYSIS OF THE RISKS AND OPPORTUNITIES RELATED TO INVESTMENTS IN HEAT PUMPS IN ITALY, BOTH ON THE SUPPLY CHAIN AND CONSUMER SIDE, AND ON THE "BANKABILITY" CONDITIONS NECESSARY TO ATTRACT CAPITAL 13

CHAPTER 4
BUSINESS MODELS AND ALTERNATIVE FINANCIAL INSTRUMENTS APPLICABLE TO THE HEAT PUMP SUPPLY CHAIN IN ITALY 20

REFERENCES 27

THE FUTURE POSITIONING OF THE HEAT PUMP SECTOR

EXECUTIVE SUMMARY 1

DEFINITIONS 2

CHAPTER 1
THE STRATEGIC CONTEXT: ARTIFICIAL INTELLIGENCE AND DATA VALORISATION IN THE ENERGY TRANSITION 3

CHAPTER 2
THE HEAT PUMP AS A "SMART NODE" TO OPTIMISE ENERGY EFFICIENCY AND COMFORT OF END USERS 11

CHAPTER 3
DATA VALORISATION IN THE RESIDENTIAL AND TERTIARY SECTOR 15

CHAPTER 4
USE CASES AND NEW BUSINESS MODELS: THE STATE OF THE ART AND SYSTEMIC PERSPECTIVES 21

REFERENCES 25

Thank you for your time

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