



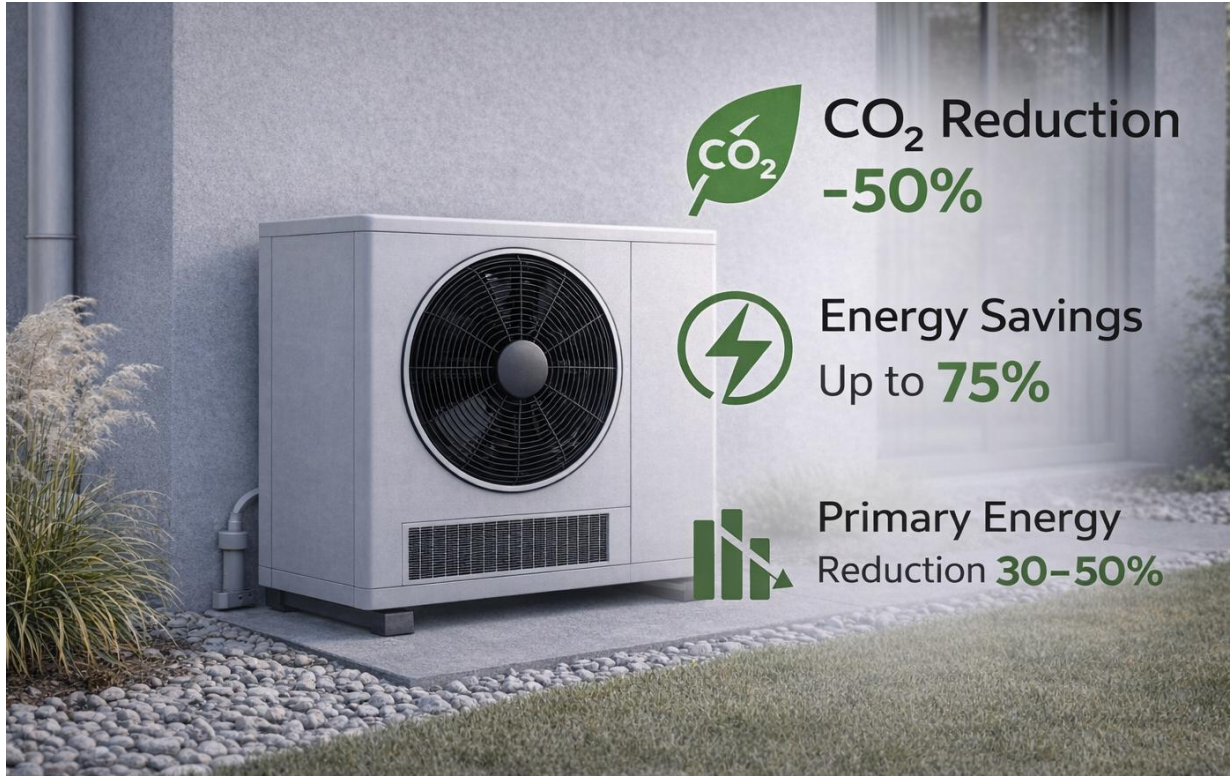
POLITECNICO
MILANO 1863

DIPARTIMENTO
DI ENERGIA

IEA HPT TCP ANNEX 51 & ANNEX 63 overview: A guide through the tasks

25.03.2026 | PATRIZIA NORINA MELOGRANO

Background



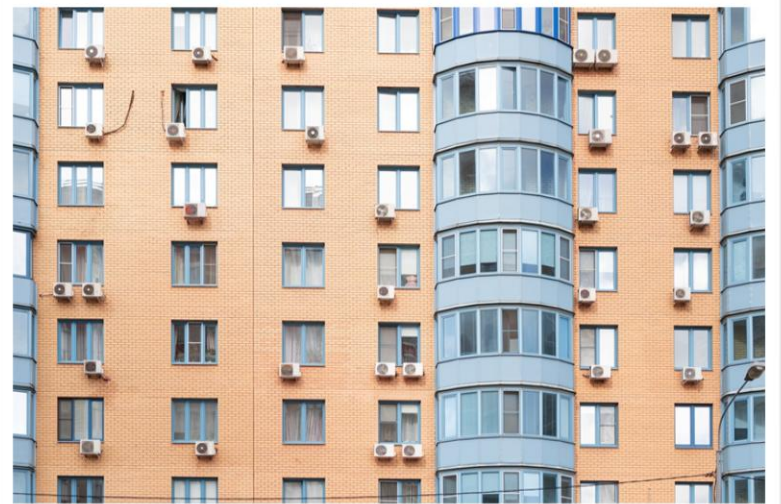
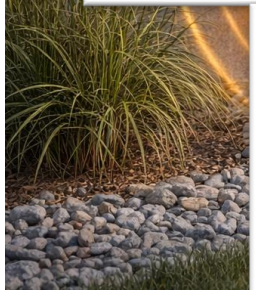


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- Depending on end user – *Neighbor* or *Owner* - noise is an outdoor and/or an indoor issue



Reduction of acoustic emissions is important to further increase the acceptance of heat pumps

INTERNATIONAL ENERGY AGENCY

IEA TECHNOLOGY COLLABORATION PROGRAMMES



ANNEX
51

START DATE:
1 April 2017

END DATE:
31 March 2020

ANNEX
63

START DATE:
1 January 2023

END DATE:
31 December 2025

- Cross-Cutting
- End-Use: Buildings**
- End-Use: Electricity
- End-Use: Industry
- End-Use: Transport
- Fossil Fuels
- Fusion Power
- Renewable Energy

End-Use: Buildings

- » Buildings and Communities (EBC TCP)
- » District Heating and Cooling (DHC TCP)
- » Energy Efficient End-Use Equipment (4E TCP)
- » Energy Storage (ECES TCP)
- » Heat Pumping Technologies (HPT TCP)**



ANNEX 51 & 63 COVERAGE

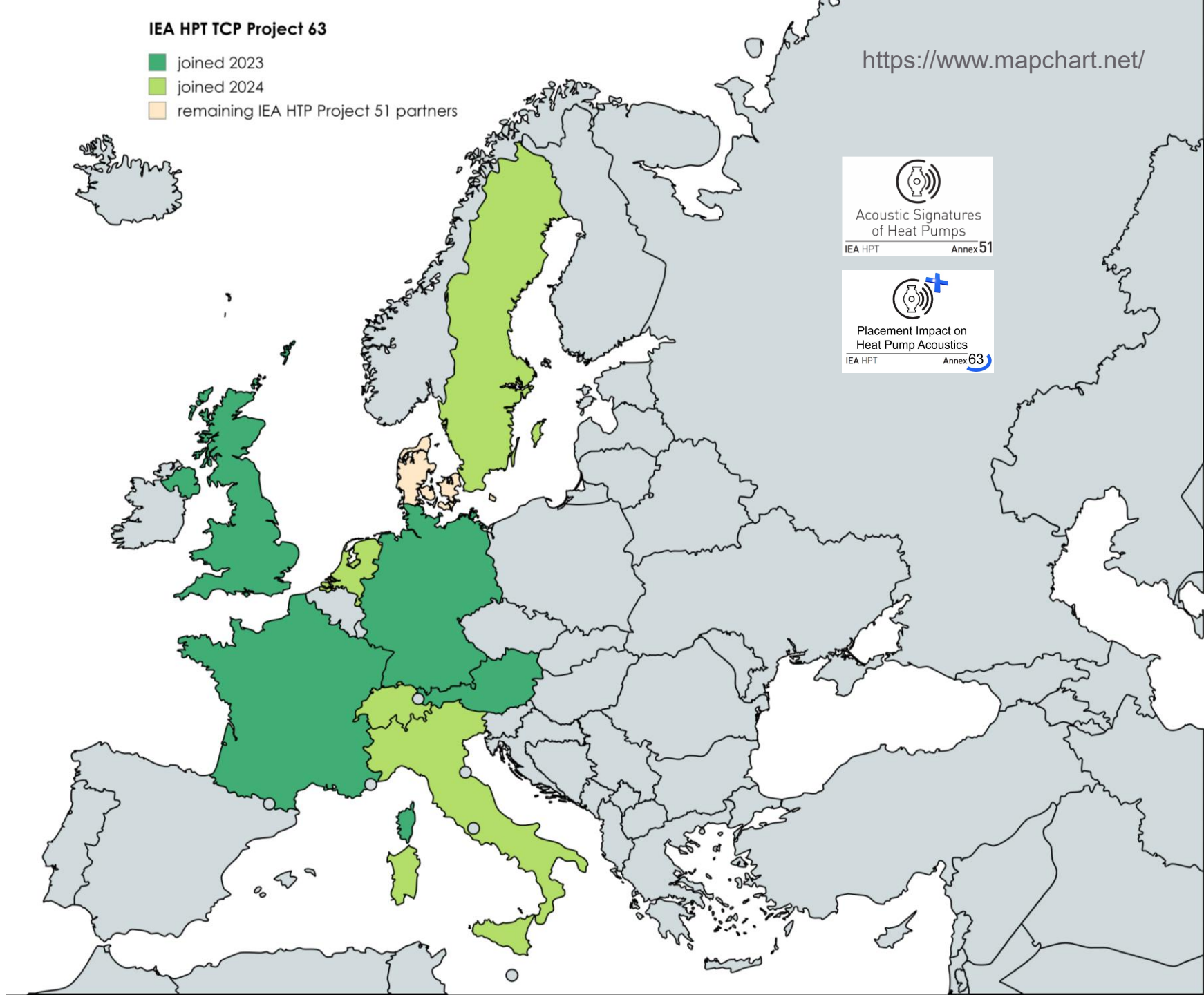
Fraunhofer ISE, Fraunhofer IBP,
RWTH Aachen,
HEAD Acoustics*
USAL*
CETIAT, CETIM
Humble*
Peutz*
BAFU*, EMPA*
ÖAW, UIBK*, AIT, TU-WIEN, TUGRAZ
RI.SE
DTI+
Polimi,
Università degli Studi
della Campania Luigi Vanvitelli*

* Annex 63 only

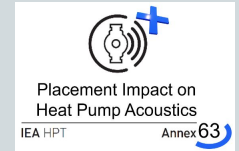
+ Annex 51 only

IEA HPT TCP Project 63

- joined 2023
- joined 2024
- remaining IEA HTP Project 51 partners



<https://www.mapchart.net/>





Acoustic Signatures
of Heat Pumps

IEA HPT Annex 51



IEA HPT ANNEX 51 "ACOUSTIC SIGNATURES OF HEAT PUMPS"

AN INTERNATIONAL COLLABORATION
IN THE FRAMEWORK OF THE IEA, APRIL 2017 - MARCH 2020



IEA HPT ANNEX 51 TASKS

Task 1: *Legislation and standards*

Task 2: *Definition of heat pump units to be covered by the study / testing*

Task 3: *Identification of noise at component and unit levels and noise control techniques*

Task 4: *Analysis of the effect of operating conditions of heat pumps on acoustic behaviour*

Task 5: *Heat pump installation and effects on surrounding environment*

Task 6: *Improved measuring and description of the acoustic performance*

Task 7: *Diffusion & dissemination of information; Guidelines, Education material, Recommendations for different user groups*





Placement Impact on
Heat Pump Acoustics

IEA HPT

Annex 63



IEA HPT ANNEX 63 "PLACEMENT IMPACT ON HEAT PUMP ACOUSTICS"

AN INTERNATIONAL COLLABORATION
IN THE FRAMEWORK OF THE IEA, JUNE 2023 - MAY 2026



IEA HPT ANNEX 63 TASKS

Task 1: *Building Acoustics Impact of Heat Pumps*

Task 2: *Urban Acoustics Impact of Heat Pumps*

Task 3: *Psychoacoustics of Heat Pumps*

Task 4: *Digitally Assisted Heat Pump Placement*

Task 5: *Dissemination*

Building Acoustics Impact of Heat Pumps

- Impact on the owner
- Structure born noise & vibrations
- Refinement of numerical and measurement methods

Psychoacoustics of Heat Pumps

- Continuation of IEA HPT Annex 51
- Panel tests
- Low frequency noise
- Heat pump interaction



Urban Acoustics Impact of Heat Pumps

- Impact on the neighbourhood
- Interaction of multiple heat pumps
- Low frequency contribution to the acoustic signature
- Operational management impact

Digitally assisted Heat Pump placement

- Deployment of enhanced 2D tool including multiple heat pumps
- Augmented reality powered 3D heat pump placement tool
- Implementation of installment guidelines into tools

Dissemination

- Tools on website and handhelds
- Updated installation guidelines
- Deliverable documents
- Publications & contributions to conferences
- Workshop

IEA HPT OUTCOMES



Task 1: *Comparison of Outdoor and Laboratory Measurements including sound pressure level and vibration levels*

Task 2: *Database of frequency resolved sound power levels including directivity for air source heat pumps*

Task 3: *Comprehensive psychoacoustic studies*

Task 4: *Internationalization and further development of 1D, 2D and 3D tools for visualization and calculation of heat pump sound pressure levels*

Task 5: *Dissemination (Forum Acusticum Euronoise Malaga 2025, Mostra Convegno 2026, Heat Pump Conference 2026, Forum Acusticum Graz 2026)*

IEA HPT ANNEX LINKS

IEA Heat Pumping Technology  



Acoustic Signatures of Heat Pumps
EA HPT Annex 51

IEA HPT Annex 51 Executive Summary

April 2017 - December 2018




Task April 2017 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

1.0: Introduction




Task April 2017 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

1.1: Measurement techniques



Task April 2017 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

1.2: Regulations - Countries overview




Task November 2017 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

1.3: Regulations - Synthesis



Task November 2018 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

2.1: Selection of Heat Pumps for Round Robin Tests

Market figures

Task November 2018 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

2.2: Round Robin Tests

Air-to-Water Heat Pump
Heat Pump Water Heater

Task November 2018 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

2.3: Seasonal Sound Power Level

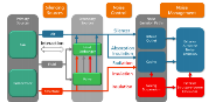
Air-to-Water Heat Pump

Task November 2018 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

3: Overview on Heat Pump Component Noise and Noise Control Techniques





Task November 2018 Review 01

IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

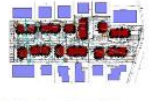
Report on Task 4: Analysis of the Effect of Operating Conditions of Heat Pumps on Acoustic Behaviour

Task November 2018 Review 01



IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

5.1: Report on heat pump installation with special focus on acoustic impact





Task November 2018 Review 01

IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51


6.1: Annoyance rating and psychoacoustical analysis of heat pump sound

Task April 2018 Review 01

IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

7.1: Educational material, guides & guidelines



Task April 2018 Review 01

IEA Heat Pumping Technology  

Acoustic Signatures of Heat Pumps
EA HPT Annex 51

7.2: Workshop material and conference contributions



Task April 2018 Review 01

IEA HPT ANNEX LINKS

IEA HPT ANNEX 51



<https://heatpumpingtechnologies.org/annex51/>

IEA HPT ANNEX 63



<https://heatpumpingtechnologies.org/annex63/>



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Contatti

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