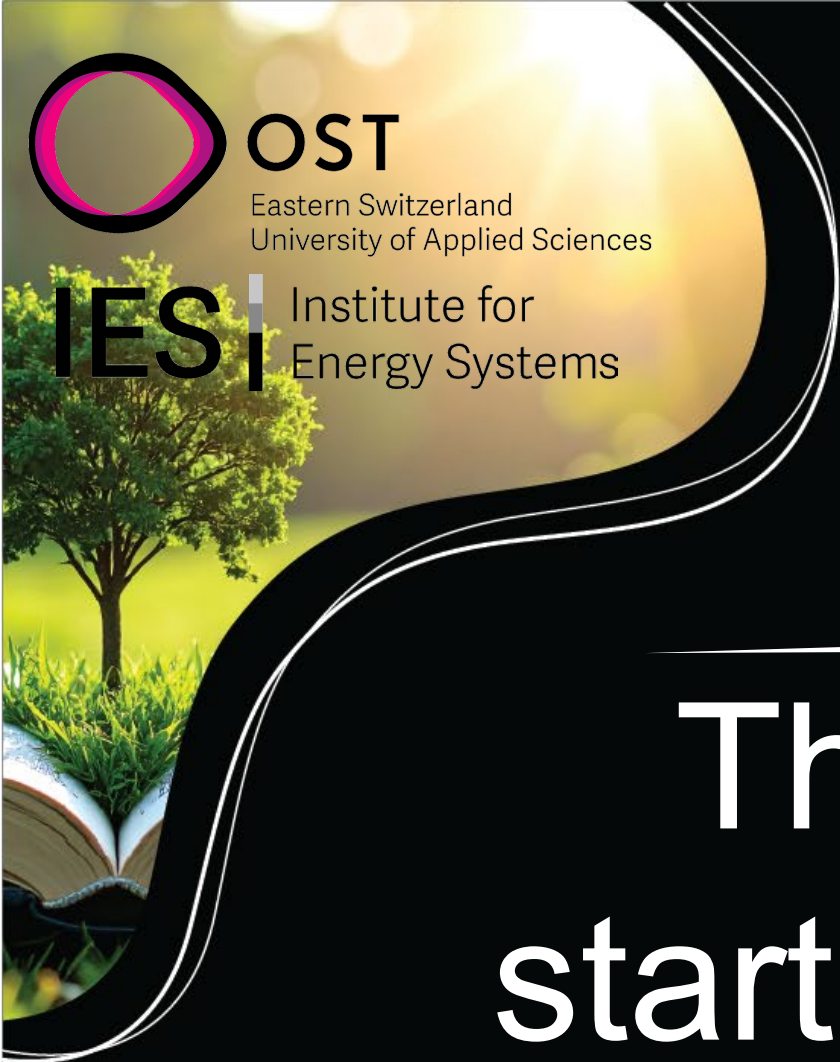




Steam Generating Heat Pumps Webinar 2025

The Webinar will start in a few minutes

Presented by OST
Dr. Frédéric Bless & Dr. Cordin Arpagaus



Steam Generating Heat Pumps Webinar

21 October 2025

13:30 Introduction

13:45 **Ruzhu Wang**
Research results of water used
as refrigerant in heat pump



14:05 **Guido Sutter**
Steam generating heat
pumps in the food industry



14:25 **Abdelmalek Bahri/Peter Kaden**
Steam compressors and steam generating
heat pumps



14:45 **Davide Rizzi**
Boosting efficiency with
turbo MVR technology



15:15 **Stefan Bertsch**
Increasing the spread of SGHPs



15:35 **André Bechem**
SGHPs in the MW-Scale for industrial applications



15:55 **Tor-Martin Tveit**
The reverse Stirling cycle applied to SGHPs

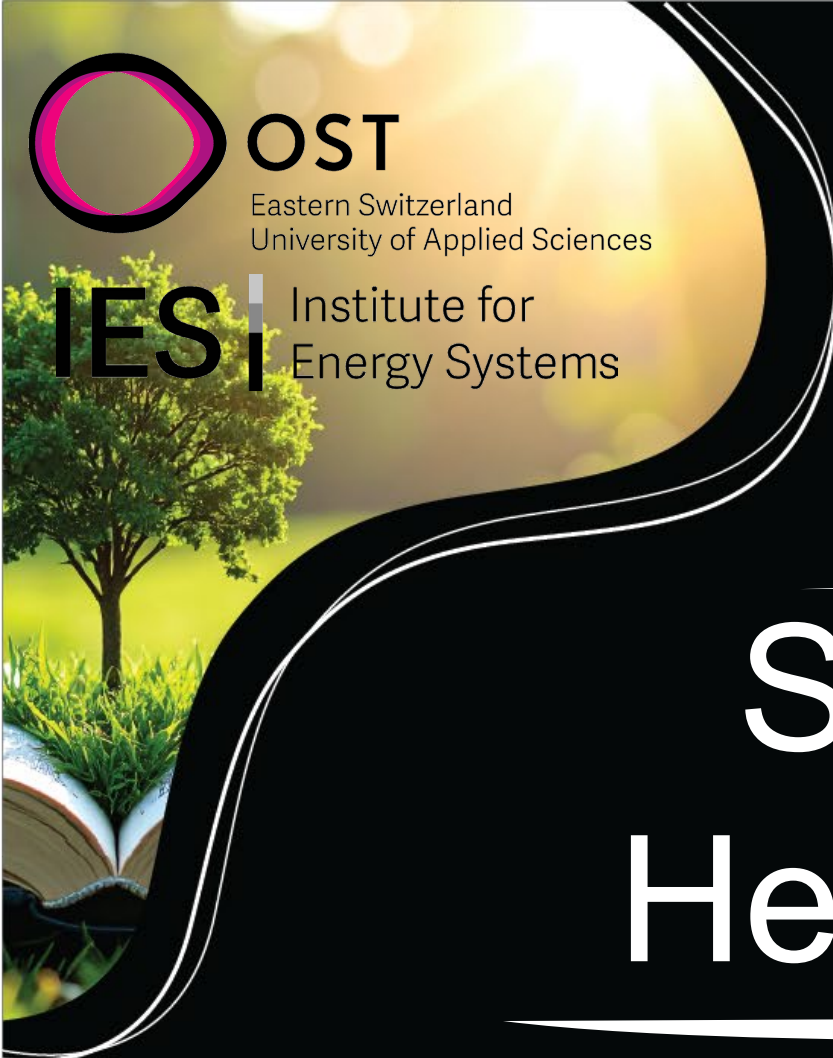


16:15 **José Luis Corrales**
R&D activities of SGHPs



16:35 Wrap-up & Conclusions





2025

Introduction

Steam Generating Heat Pumps Webinar

Presented by OST
Dr. Frédéric Bless



As long as we live in such a world, **Steam-Generating Heat Pumps** are the most interesting solution



Introduction

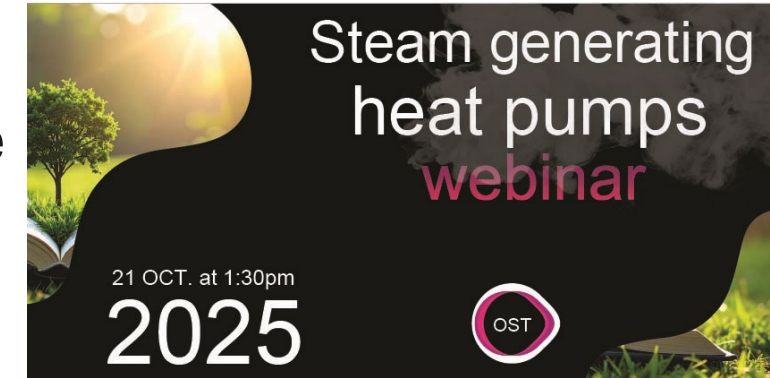
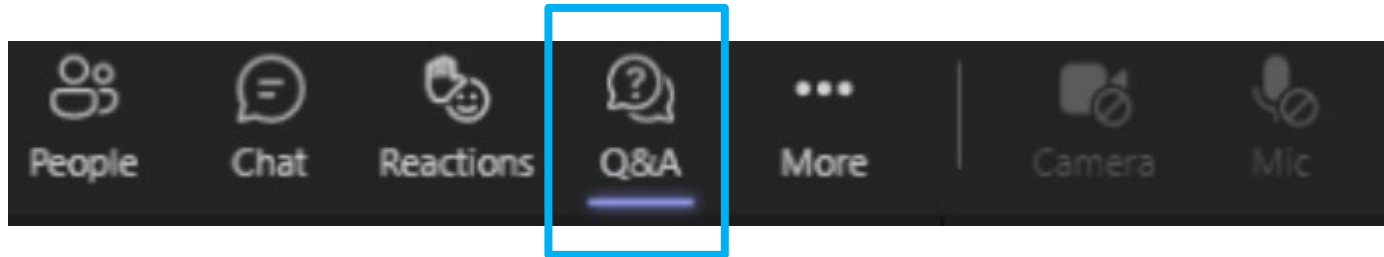
Explanations of today's webinar

- Information about this Webinar
- Presentation of OST and Institute for Energy Systems (IES)
- Agenda

Introduction

Webinar Housekeeping

- The webinar is being **recorded**
- The video and the presentation slides will be available after the event and published on the [SWEET DeCarbCH Events Website](#)



- Participant microphones and cameras are switched off
- Use the **Q&A tab** to ask questions (first type speaker name & insert question)
- If time permits, we will answer questions live after each presentation, otherwise via the Q&A and Chat tabs

Introduction

Webinar Recordings will be available on



- <https://www.sweet-decarb.ch/events/event/steam-generating-heat-pumps-ost-webinar-2025>
- <https://www.youtube.com/@sweetdecarbch>

sweet swiss energy research
for the energy transition



DeCarbCH

Decarbonisation of Cooling and Heating in Switzerland

(SFOE funded project [SI/502260](#))

Mission Statement:

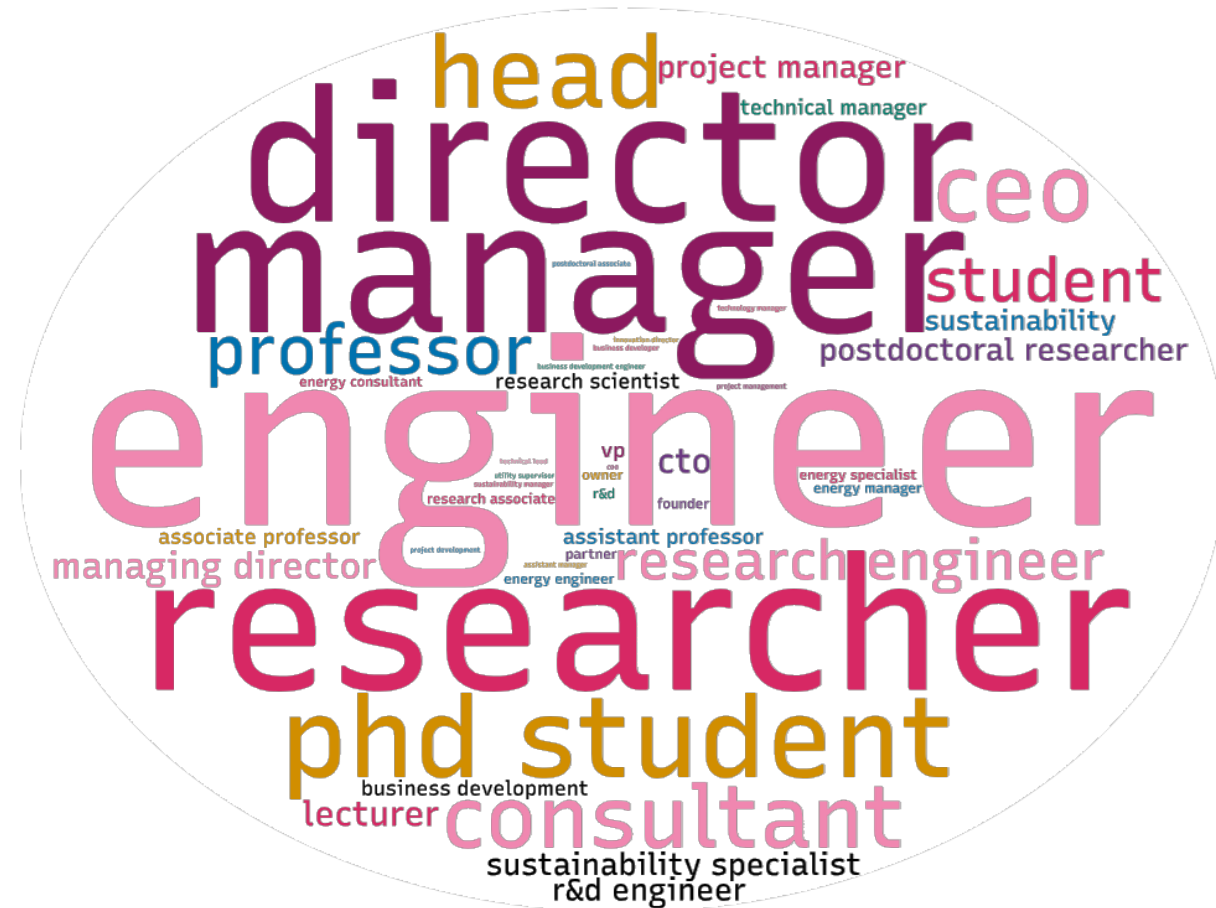
Facilitate, speed up and
de-risk decarbonization of
heating and cooling

Follow-us on **LinkedIn**

<https://www.linkedin.com/company/74517939>

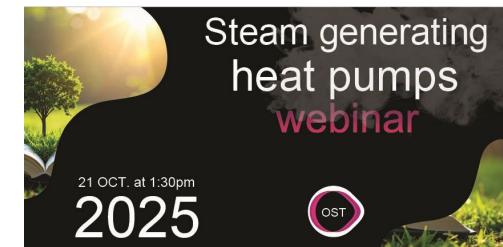
Introduction – High international interest in the topic of Steam Generating Heat Pumps

We have more than **710** webinar registrations from **50** countries



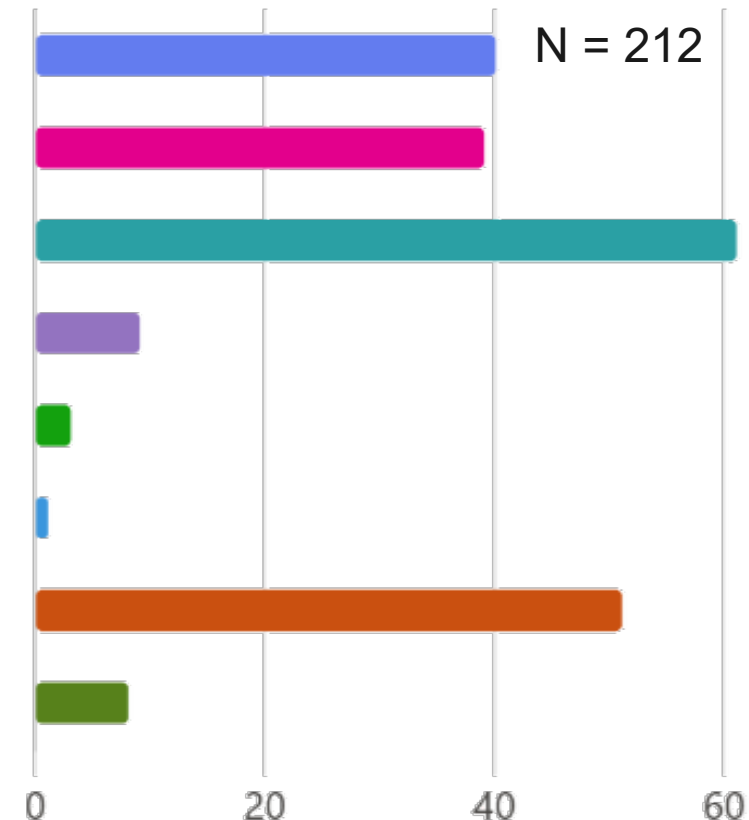
Steam generating heat pumps Webinar 2025

Pre-Webinar Survey Results



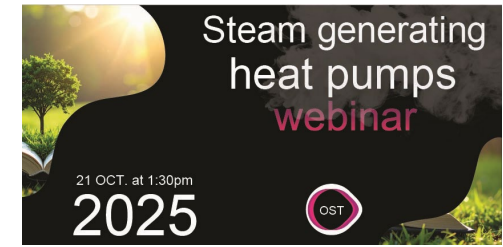
Q15: What best describes your professional background or main area of work? (multiple answers possible)

☐ I work in an energy-intensive industrial sector	40	18%
☐ I work as a planner or consultant	39	18%
☐ I work in a company that manufactures heat pumps	61	28%
☐ I am a user of a steam system	9	4%
☐ I work in policy or public administration	3	1%
☐ I represent a network, association, or media organization	1	1%
☐ I work in academia or research	51	24%
☐ Other: ____	8	3%



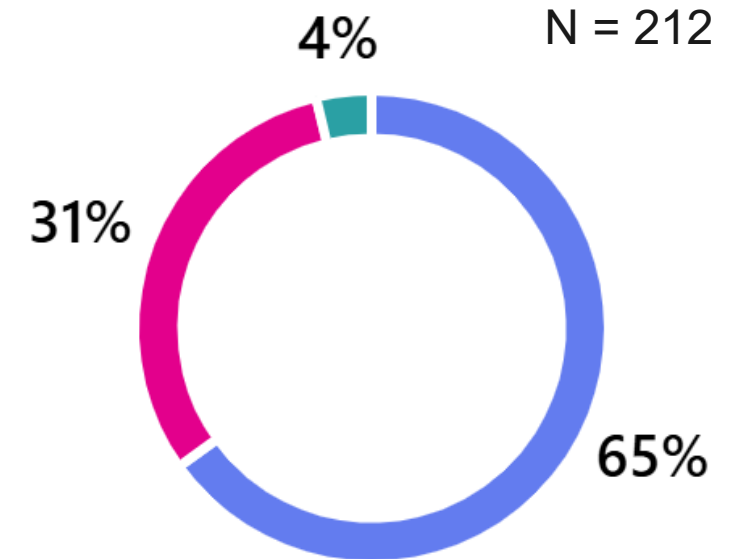
Pre-Webinar Survey Results

We have asked about your **interest** in this webinar.



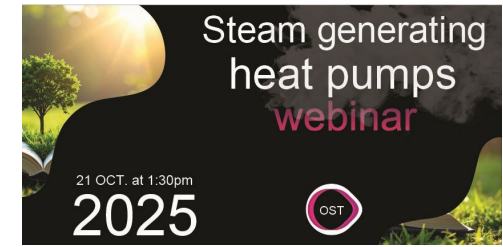
Q1: How familiar are you with heat pump technologies in general?

● Very familiar – I work with them regularly	138
● Somewhat familiar – I have basic knowledge	66
● Heard of them, but little hands-on experience	8
● Not familiar at all	0

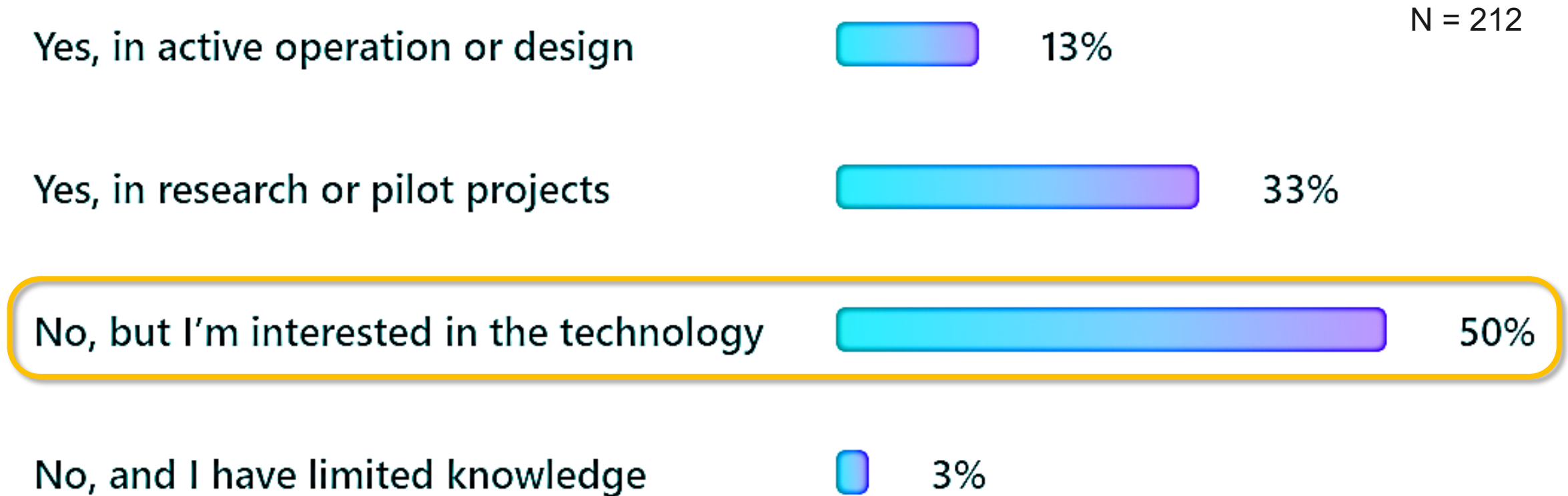


Steam generating heat pumps Webinar 2025

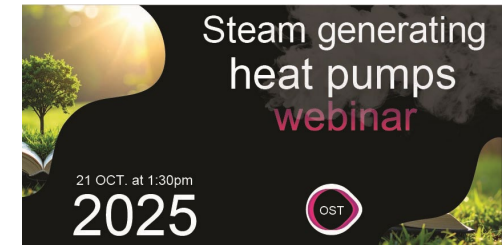
Pre-Webinar Survey Results



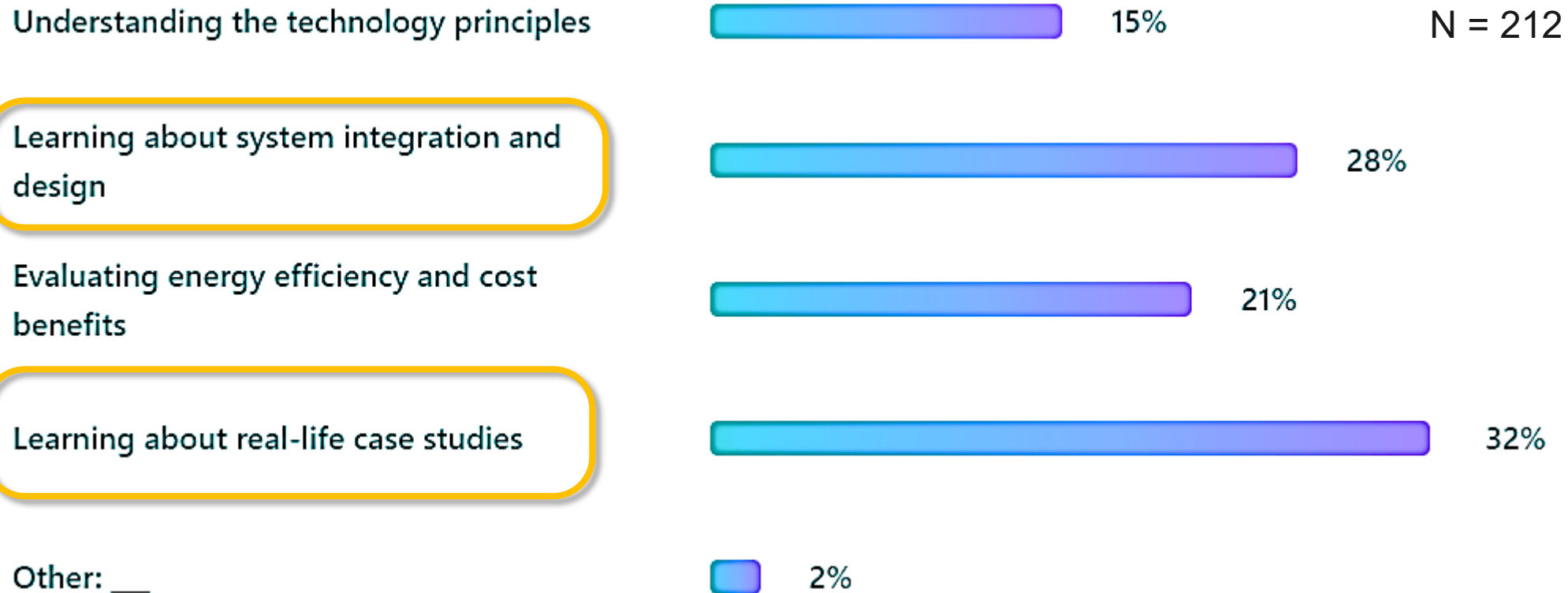
Q2: Have you previously worked with Steam-Generating Heat Pumps?



Pre-Webinar Survey Results



Q6: What are your main expectations for this SGHP Webinar 2025? (multiple answers possible)



Introduction – Where we are

Heat pump test center (WPZ) at OST in Buchs, Switzerland



OST Campus Buchs

IES Institute for Energy Systems

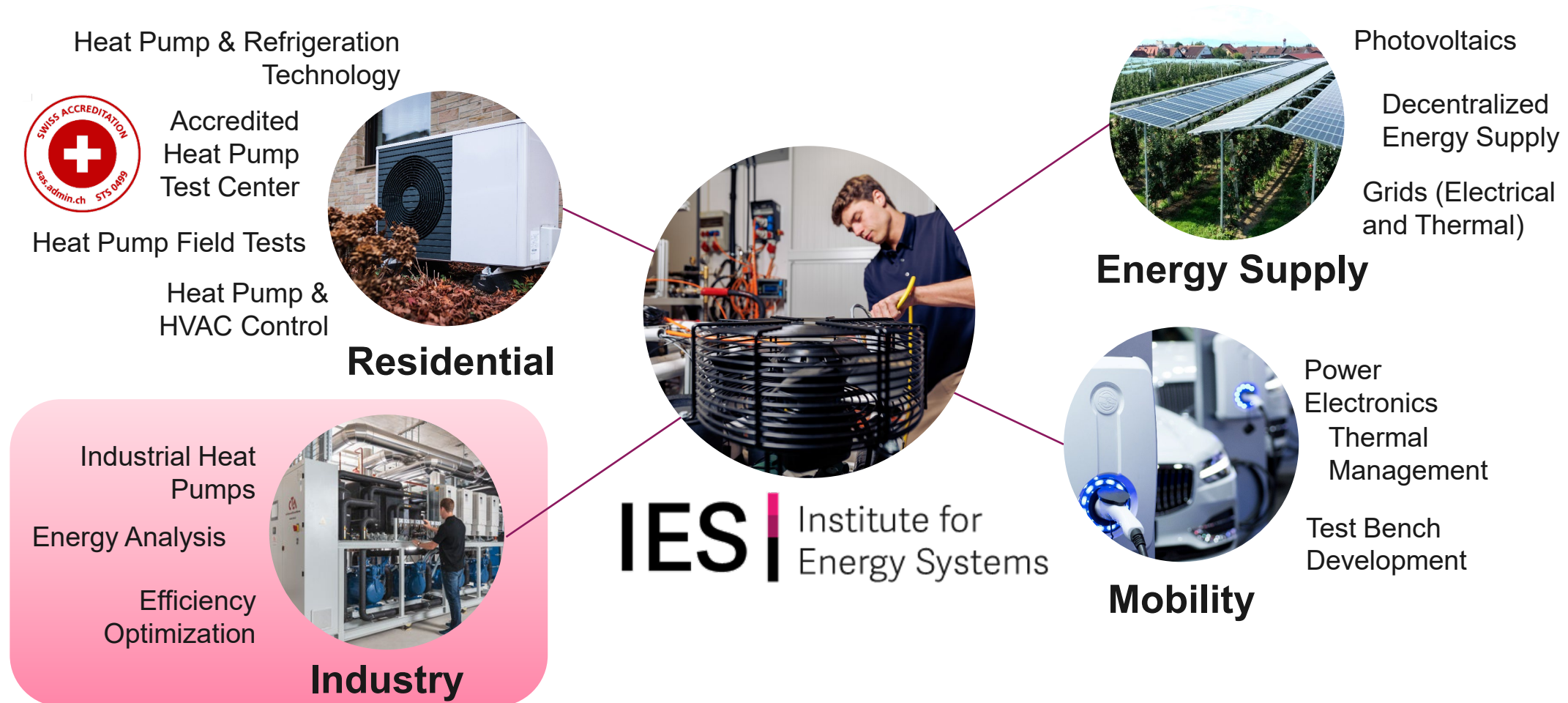


www.ost.ch/ies

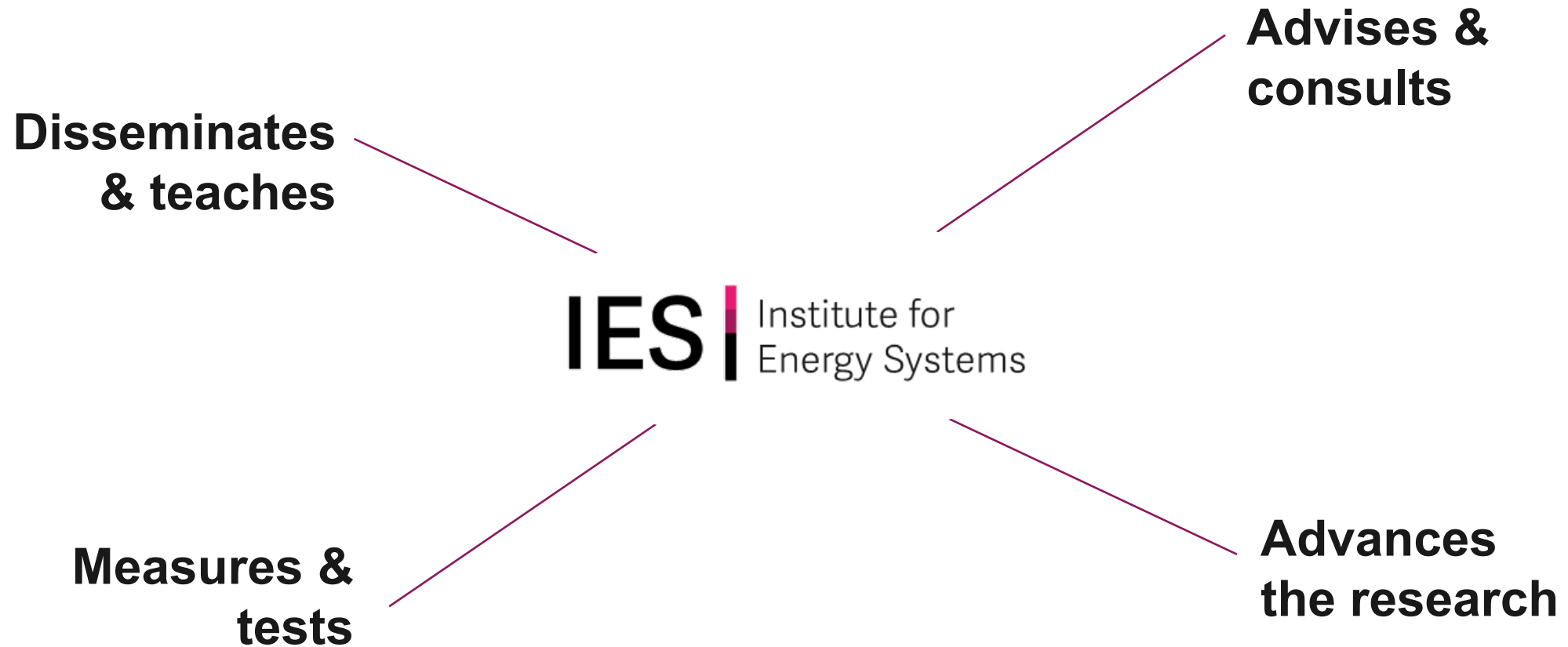
www.wpz.ch



«Engineering a Net Zero Future that Works»



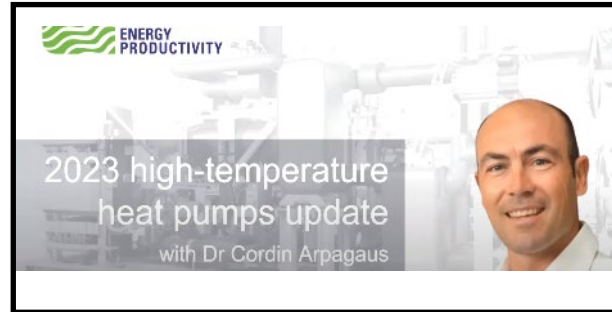
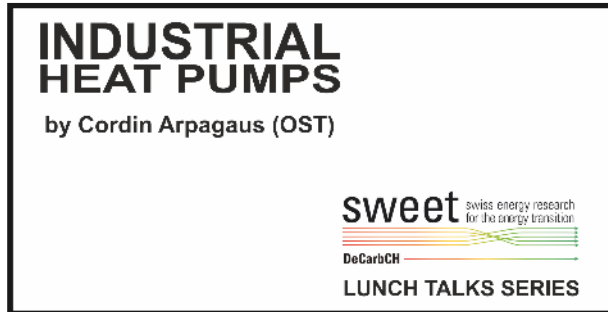
«Engineering a Net Zero Future that Works»



Introduction – OST IES – Dissemination & Teaching

YouTube Videos on High-Temperature Heat Pumps

~ 70 participants



~ 570 participants



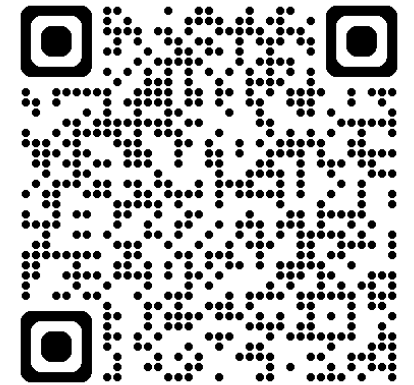
23 March 2023
(>8'200 views)



19 November 2021
(1'917 views)



22 February 2023
(8'863 views)

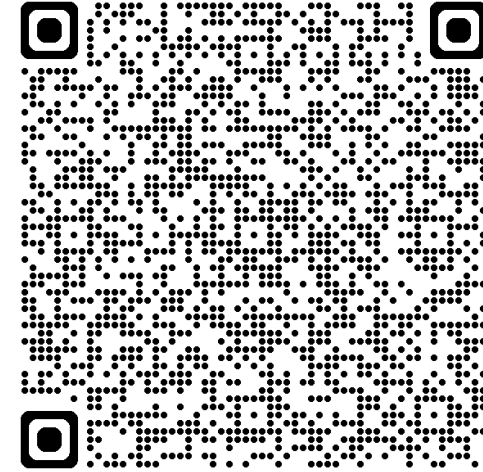


18 March 2024
(>7'200 views)

Introduction – OST IES – Dissemination & Teaching

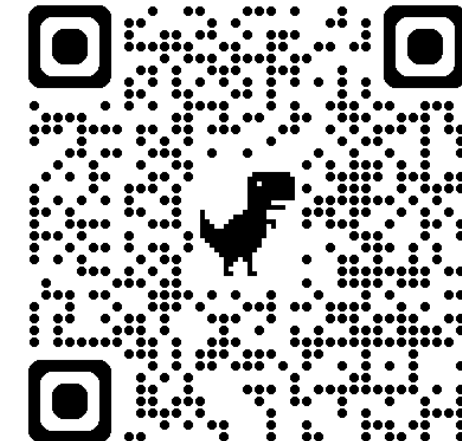
■ 4 days course: Continuing Education Course «Industrial heat pumps»

- In English once a year
- 2 days are available online
- Registration: [link](#)



■ Diverse CAS courses:

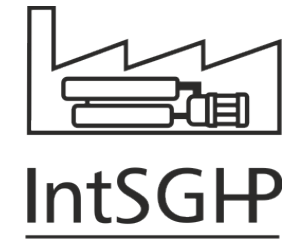
- In German
- Available for people in the region
- Registration: [link](#)



Introduction – OST IES – Advises & Consulting

■ Integration of Steam Generating Heat Pumps

- Analysis of three Swiss companies
- More info: [link](#)



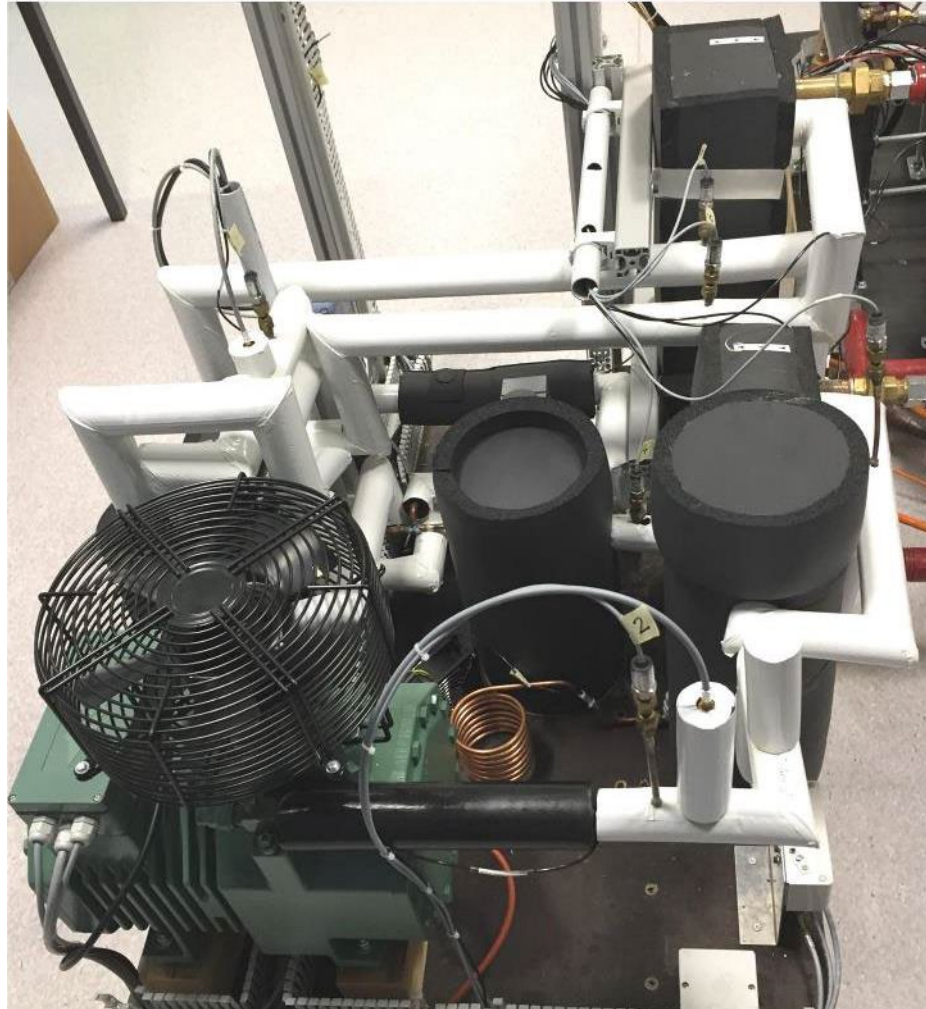
■ HTHP-CH – Integration of High-Temperature Heat Pumps in Swiss Industrial Processes

- Analysis of three Swiss companies
- More info: [link](#)

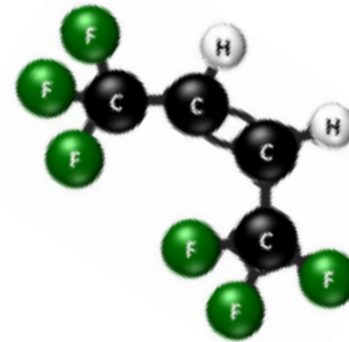


Many more direct consulting with Swiss companies

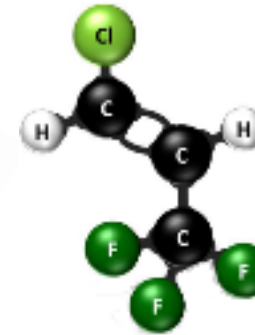
Testing synthetic HFO/HCFO refrigerants up to 150 °C



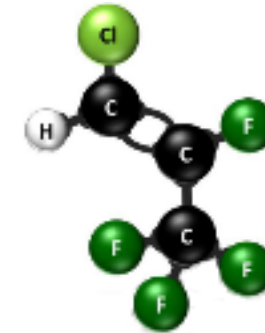
HFO: Hydrofluorolefine, HCFO: Hydrochlorfluorolefine



R1336mzz(Z)



R1233zd(E)



R1224yd(Z)

Properties:

- Low GWP
- Zero/near zero ODP
- Short atmospheric life
- Not flammable
- Not toxic

Refrigerant	ODP	GWP ₁₀₀	SG
R1336mzz(Z)	0	2	A1
R1233zd(E)	0.00034	1	A1
R1224yd(Z)	0.00023	0.88	A1
R245fa	0	858	B1

More info: [link](#)

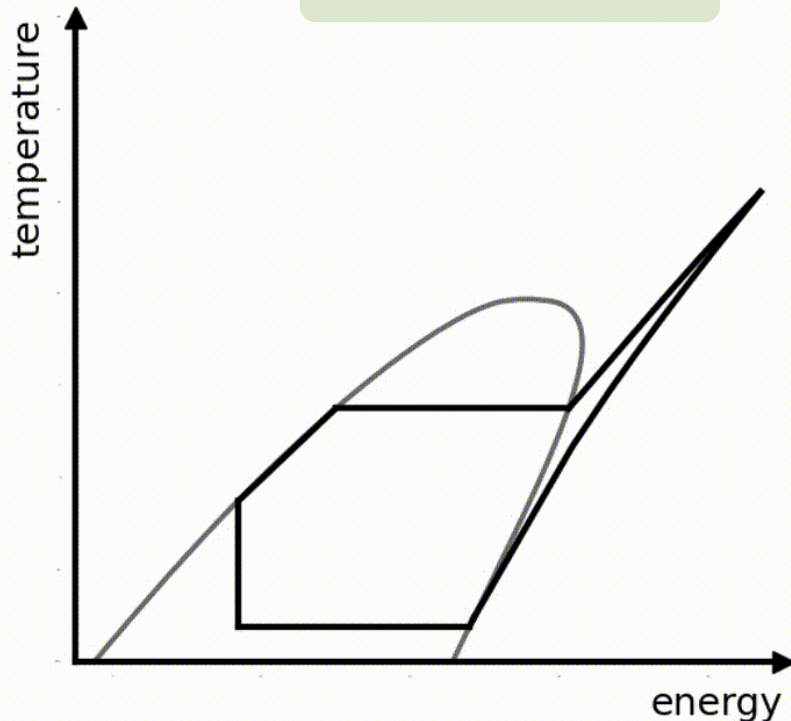
R600/R718 (Butane/Water) Steam generating heat pump



High-Efficiency HTHPs with Temperature Glide

One refrigerant mixture offers **many** options

Mixture **A + B**



Adapted cycle for **maximum efficiency**
→ **Decrease of OPEX**

Flexibility through mixture adjustment

- One heat pump for various applications
- Increase of standardization

→ **Decrease of CAPEX**

Project goals

- **Experimental demonstration**
- Clustering of promising applications
→ Suitable refrigerant mixtures
- Guideline for handling mixtures in practice

Partners:

ETH zürich



Funding:



Introduction – OST IES – Advancing Research

Part of various national and international projects

 **Push2Heat**

 **ZIMBA**

sweet swiss energy research
for the energy transition

DeCarbCH 



International
Energy Agency

Annex 48

Annex 58

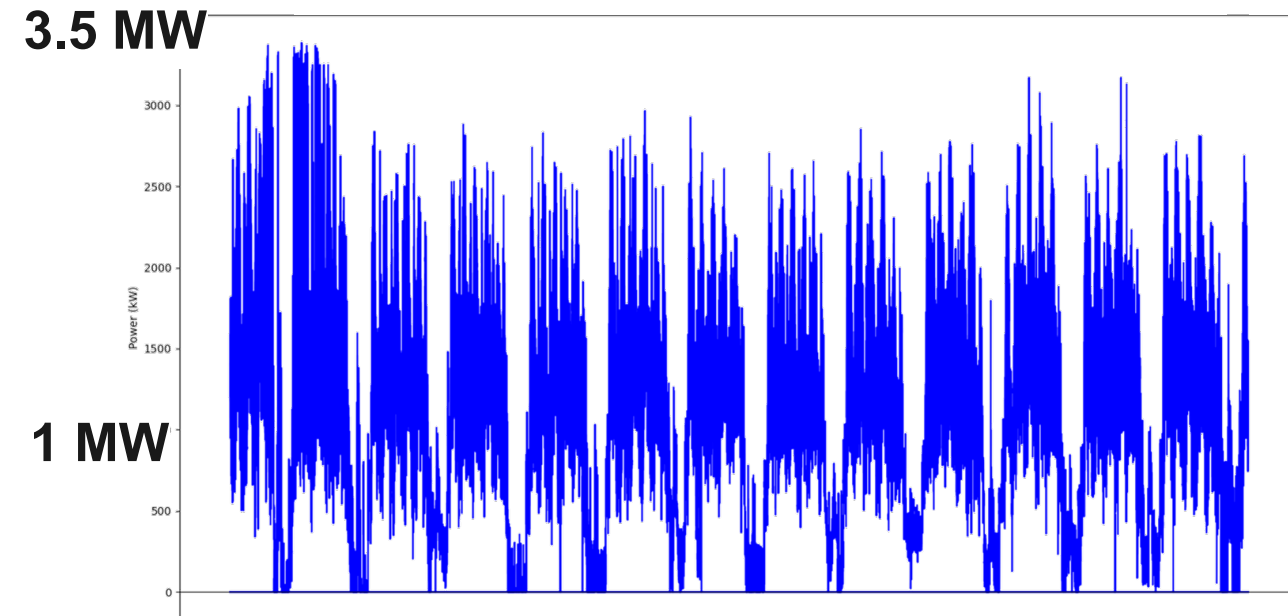
Annex 59

Annex 68

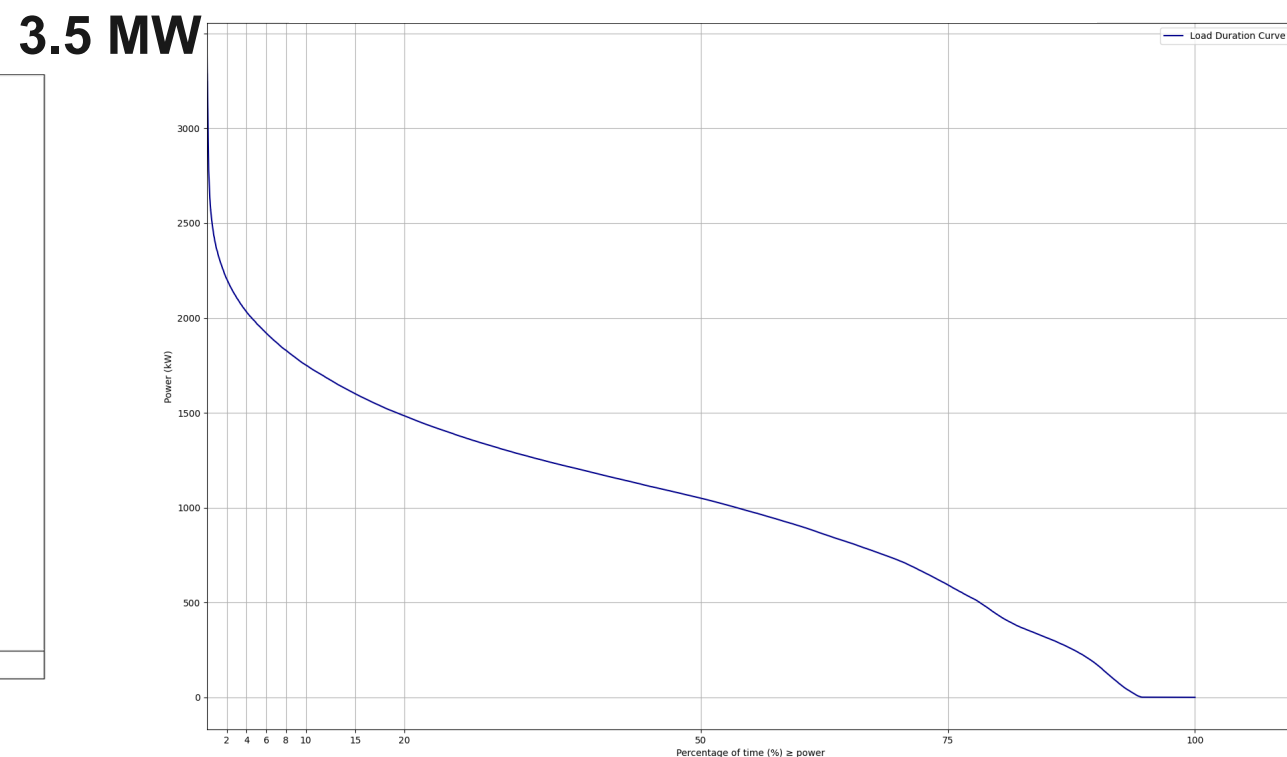
Looking at reducing capital cost of industrial heat pumps

DECINE^l

Steam demand for 3 months



Load duration curve

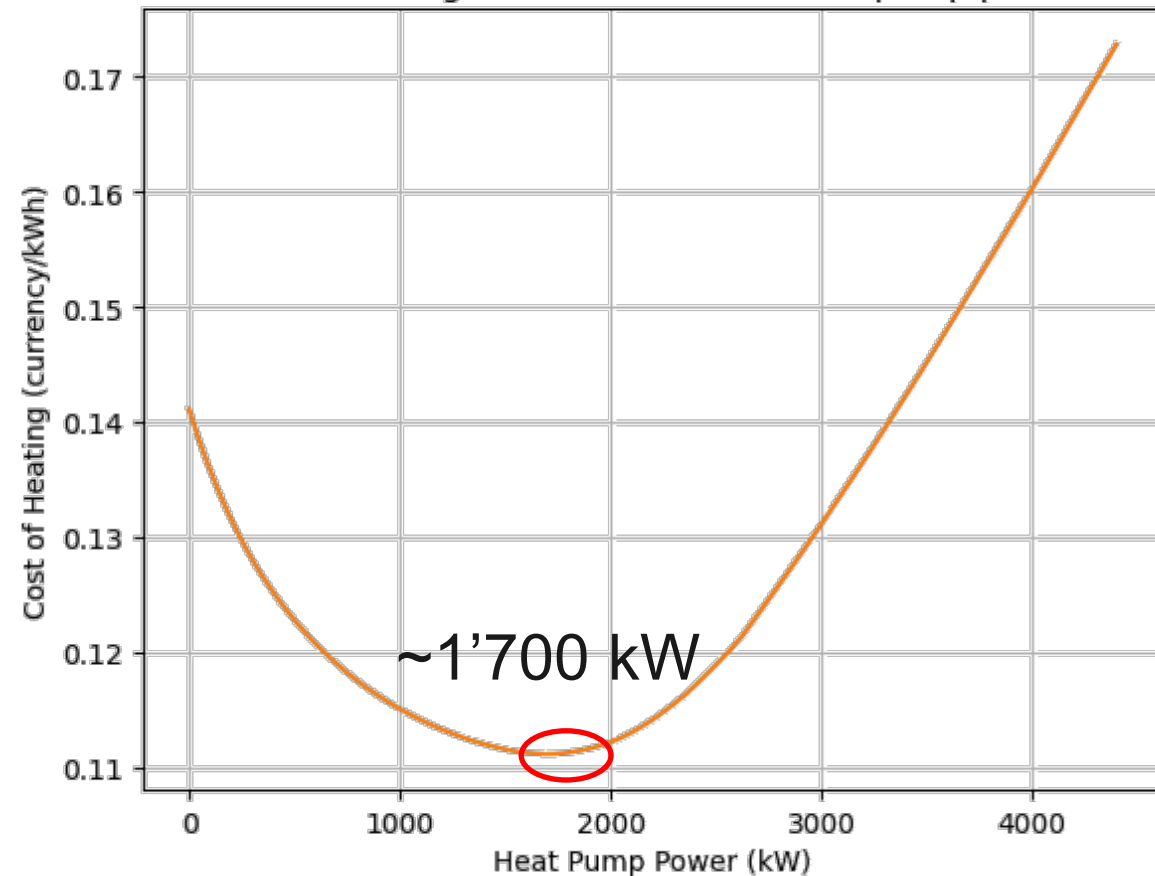


Introduction – OST IES – Advancing Research

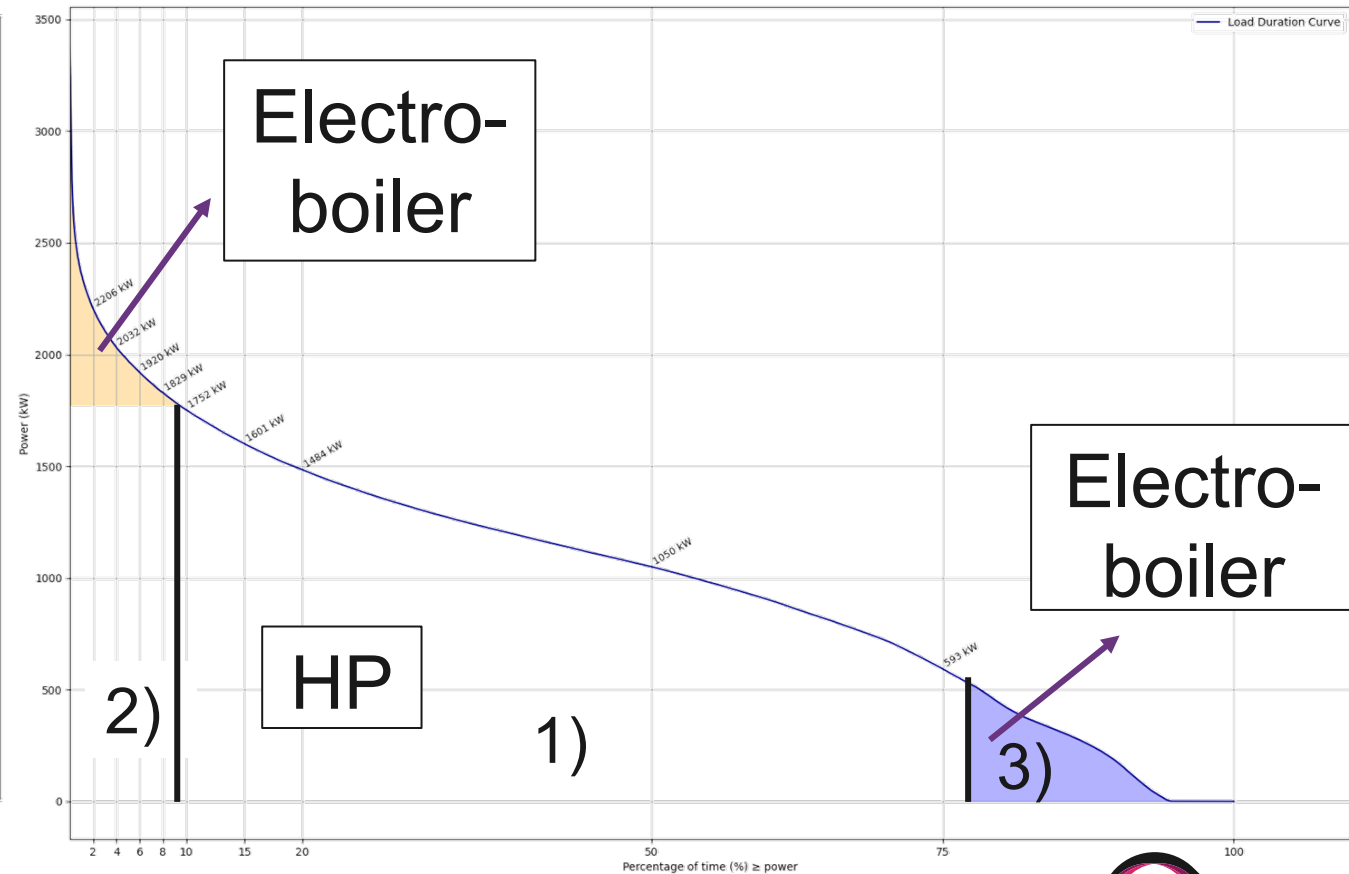
Looking at reducing capital cost of industrial heat pump

DECINE^l

Cost of Heating (COH) for different heat pump powers



Load duration curve

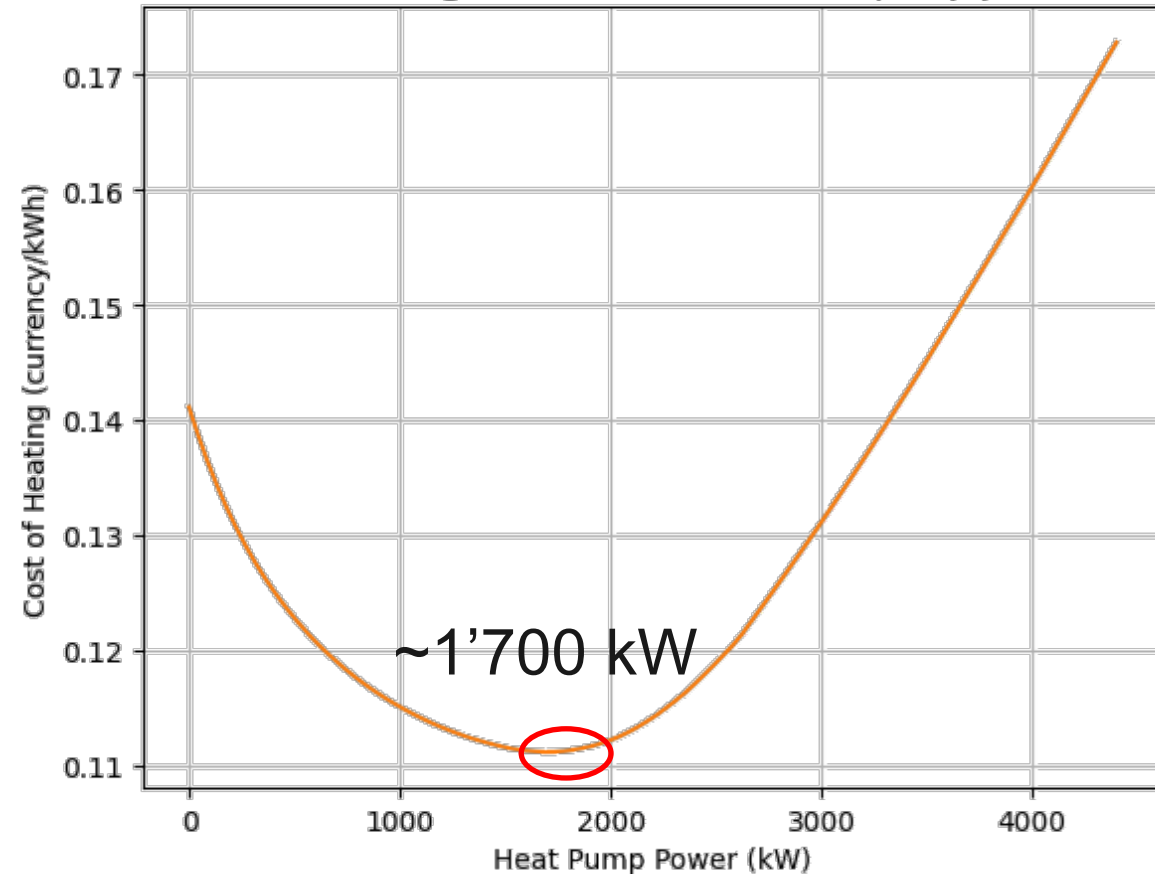


Introduction – OST IES – Advancing Research

Looking at reducing capital cost of industrial heat pump

DECINE^l

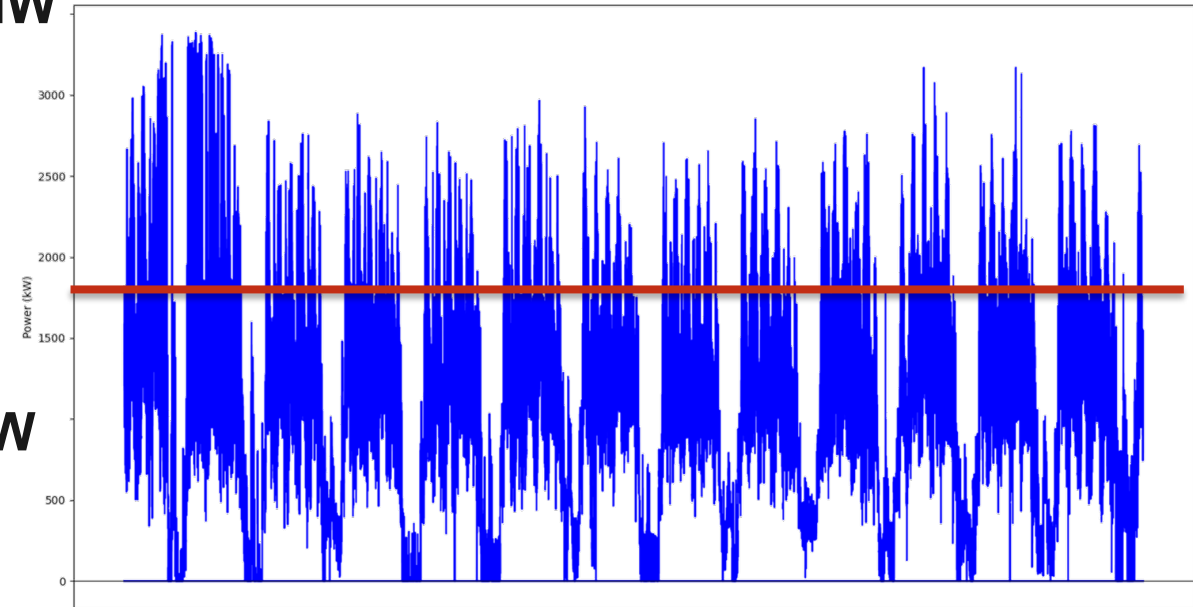
Cost of Heating (COH) for different heat pump powers



Steam demand for 3 months

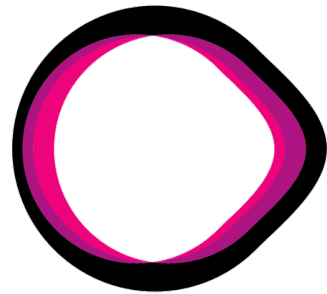
3.5 MW

1 MW



Introduction

Welcome to the Webinar!

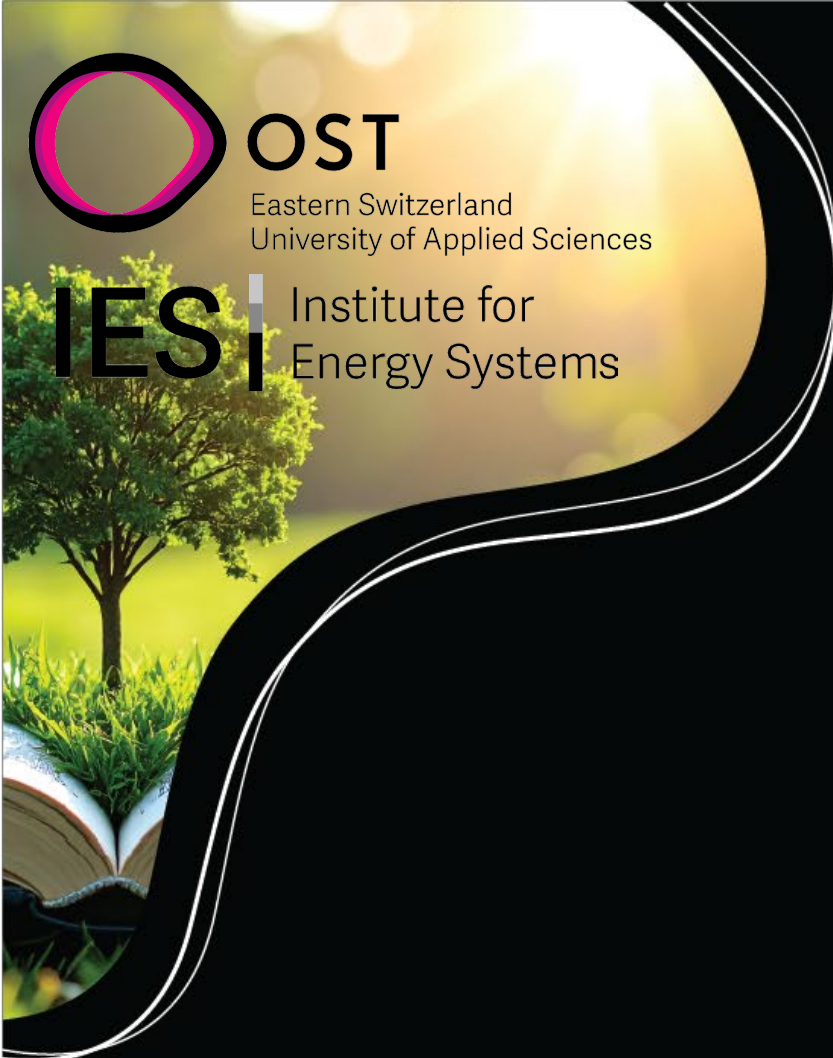


OST

Eastern Switzerland
University of Applied Sciences

IES | Institute for
Energy Systems

www.ost.ch/ies



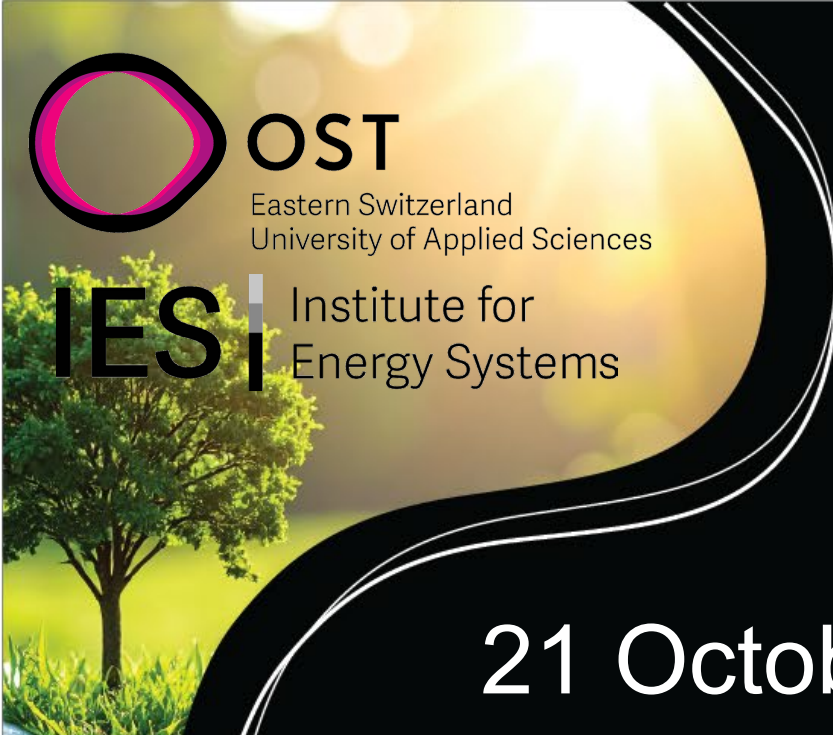
OST

Eastern Switzerland
University of Applied Sciences

IES

Institute for
Energy Systems

This webinar allows us to
disseminate the knowledge
about **steam generating**
heat pumps more widely
and helps us and others to
advise companies in the
best possible way.



Steam Generating Heat Pump Webinar

21 October 2025

13:30 Introduction

13:45 **Ruzhu Wang**
Research results of water used
as refrigerant in heat pump

14:05 **Guido Sutter**
Steam generating heat
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14:25 **Abdelmalek Bahri/Peter Kaden**
Steam compressors and steam generating
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14:45 **Davide Rizzi**
Boosting efficiency with
turbo MVR technology



15:15 **Stefan Bertsch**
Increasing the spread of SGHPs

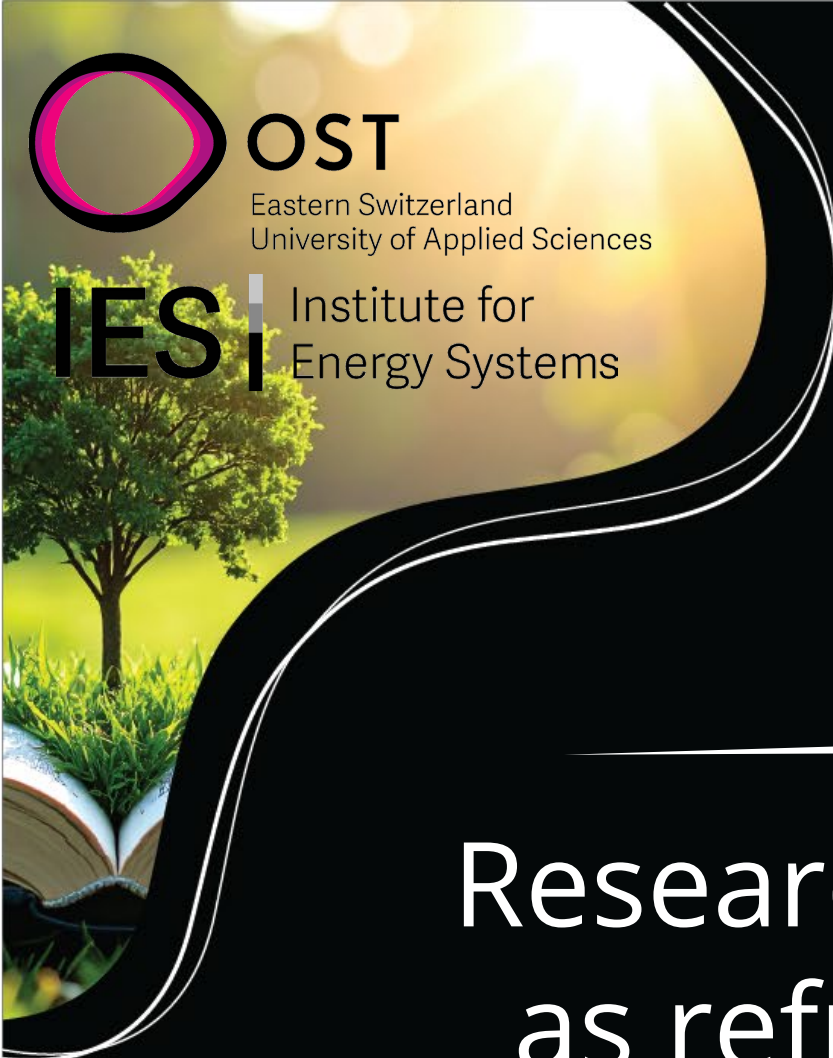
15:35 **André Bechem**
SGHPs in the MW-Scale for industrial applications

15:55 **Tor-Martin Tveit**
The reverse Stirling cycle applied to SGHPs

16:15 **José Luis Corrales**
R&D activities of SGHPs

16:35 Wrap-up & Conclusions





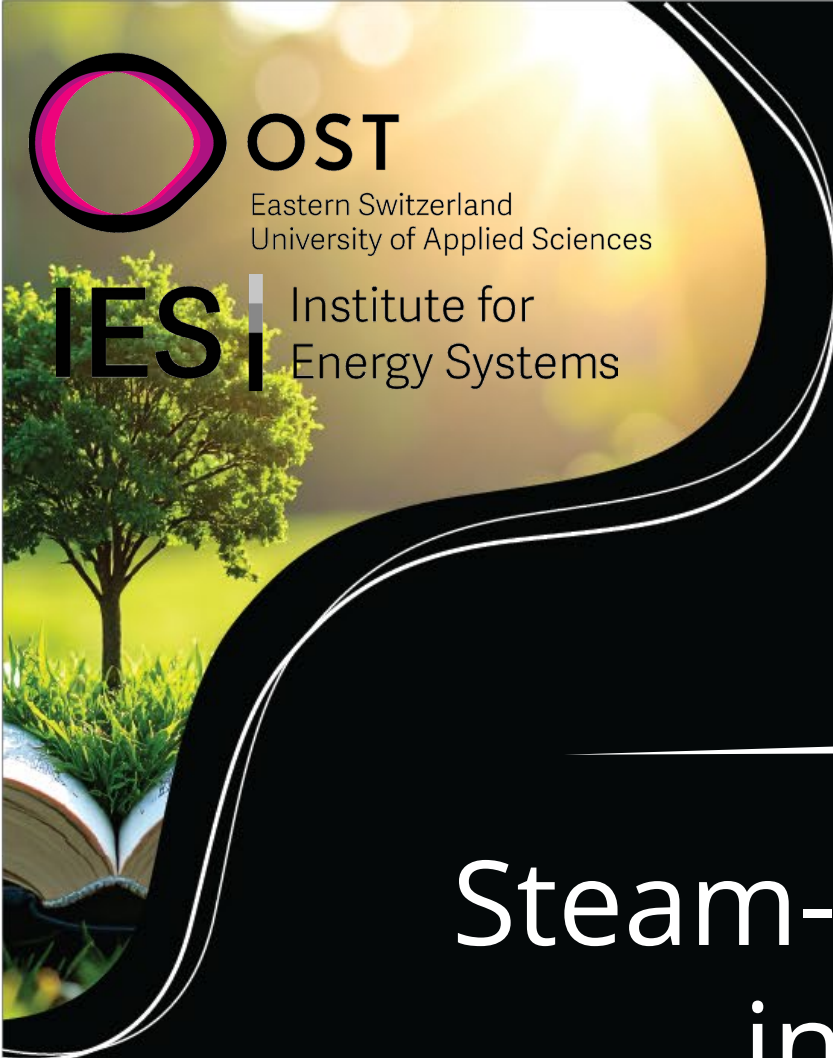
2025

Ruzhu Wang



Research results of water used as refrigerant in heat pumps



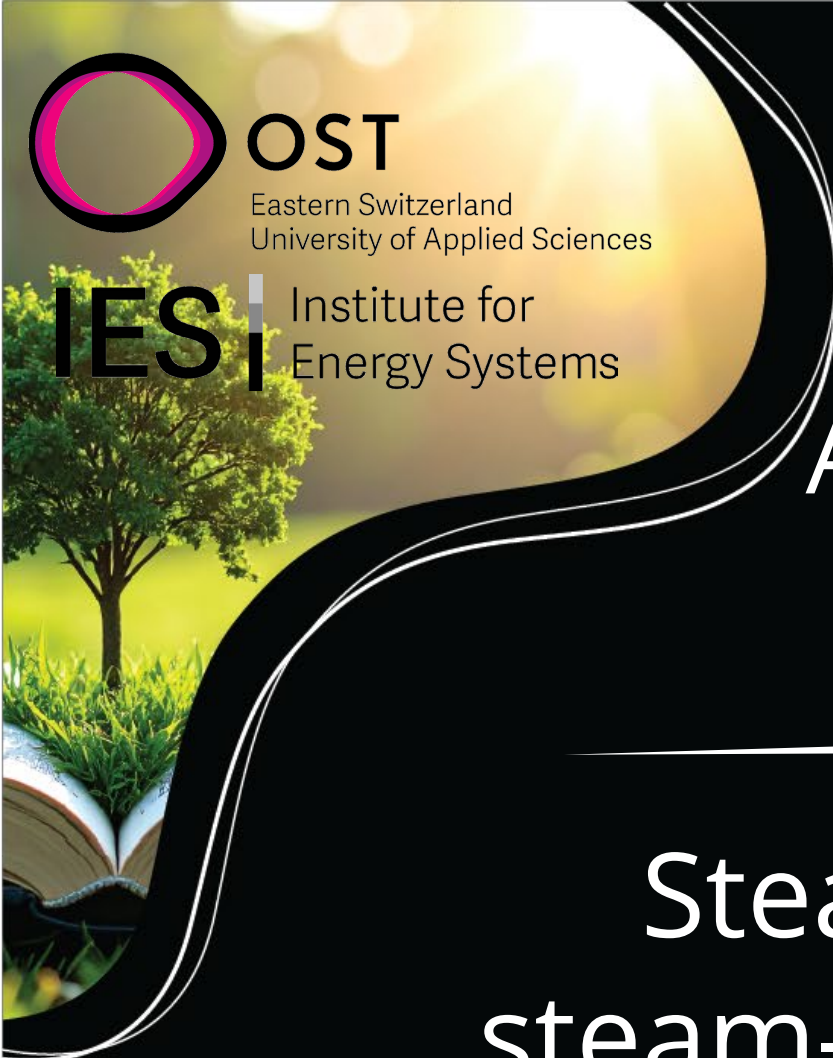


2025

Guido Sutter



Steam-generating heat pumps in the food industry

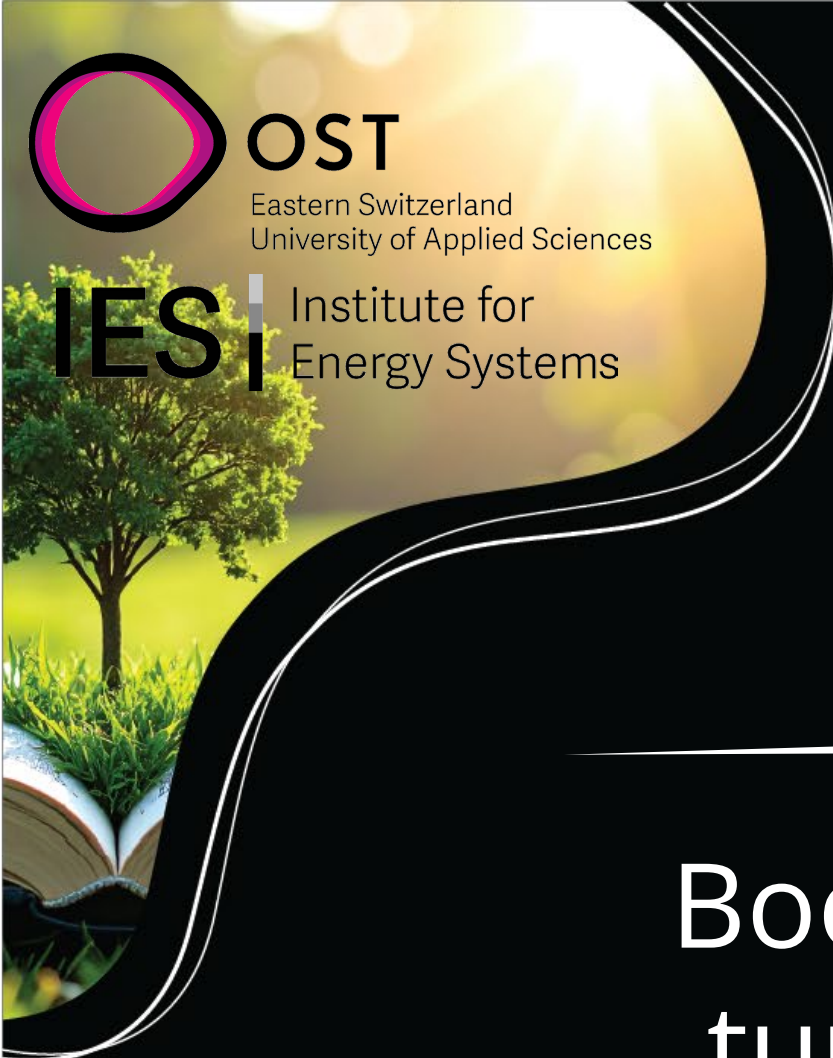


2025

Abdelmalek Bahri
& Peter Kaden



Steam compressors and steam-generating heat pumps

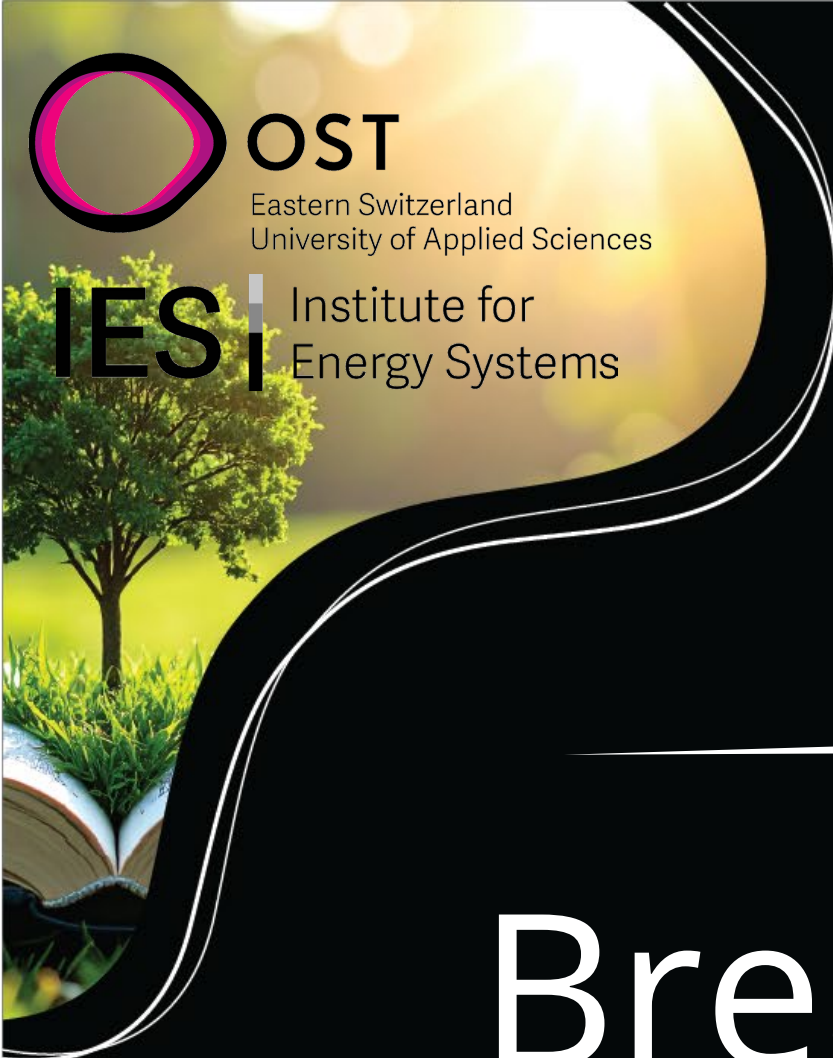


2025

Davide Rizzi



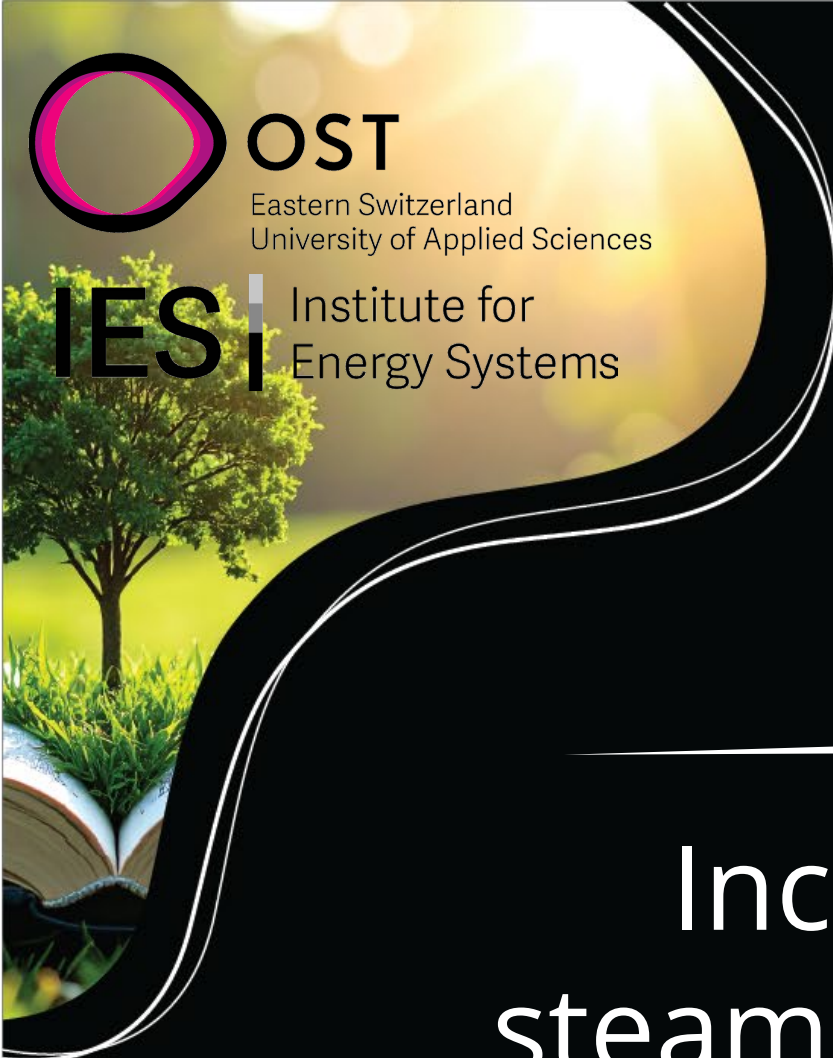
Boosting efficiency with turbo MVR technology



2025

Steam Generating Heat Pumps Webinar

Break until 15:15

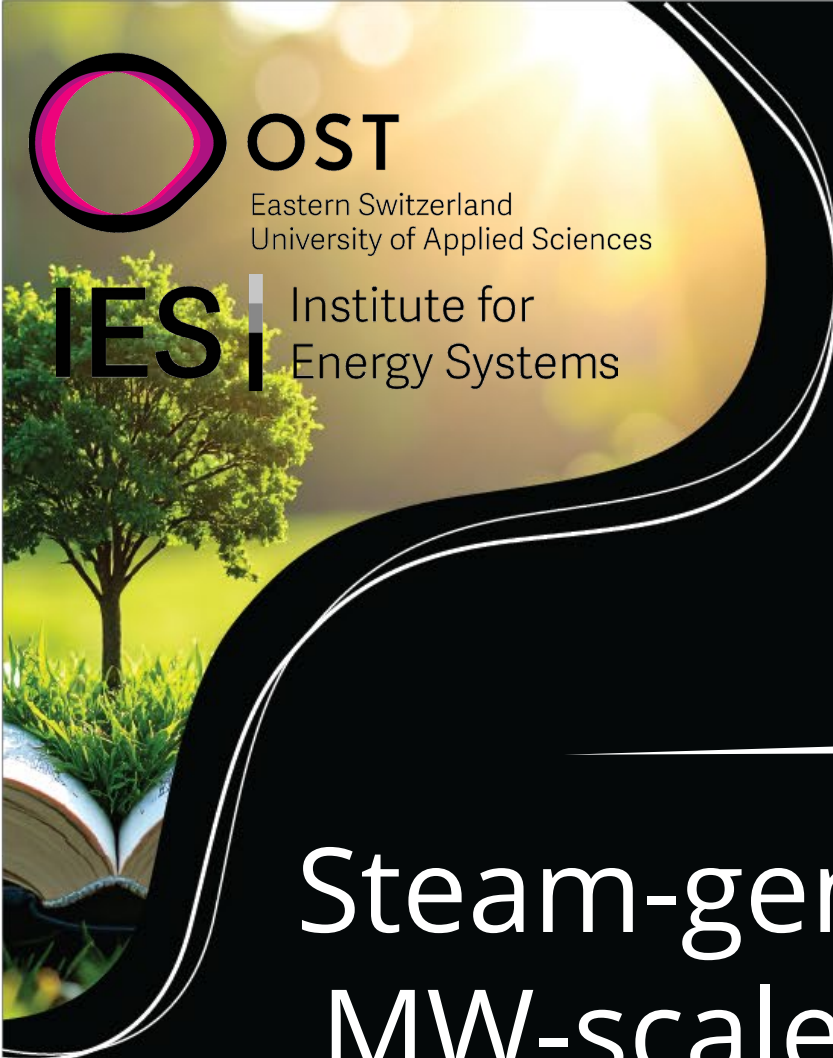


2025

Stefan Bertsch



Increasing the spread of steam-generating heat pumps

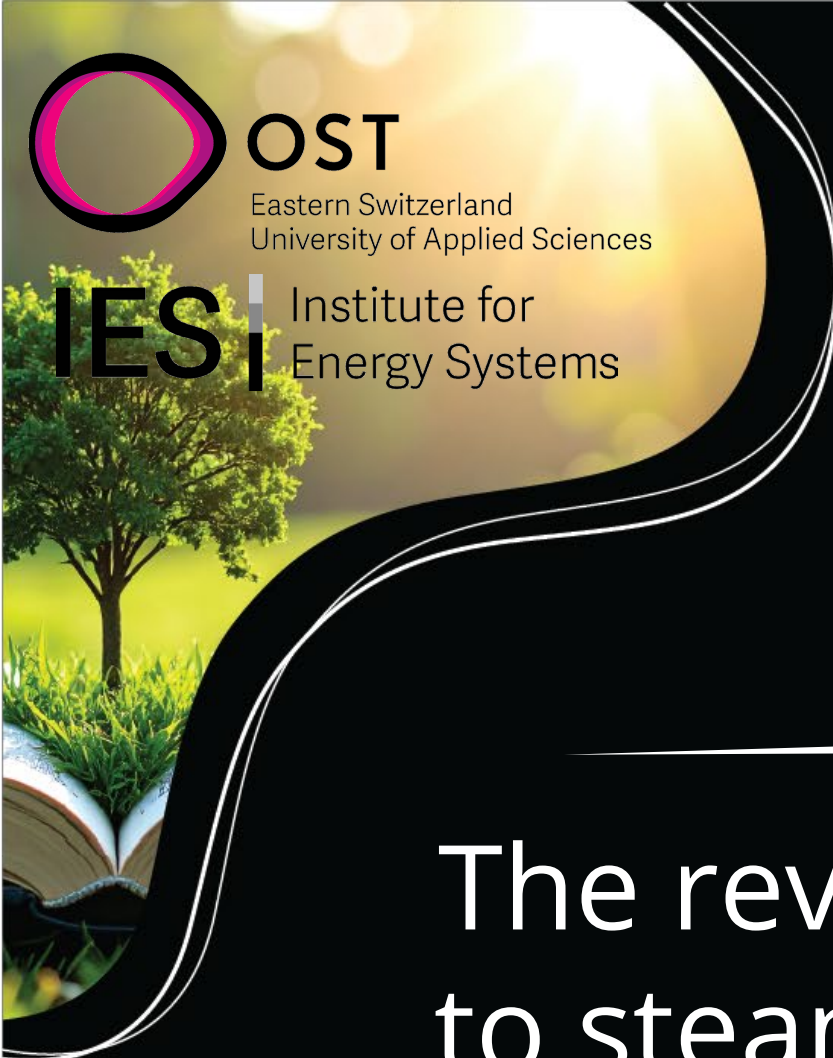


2025

André Bechem



Steam-generating heat pumps in the MW-scale for industrial applications

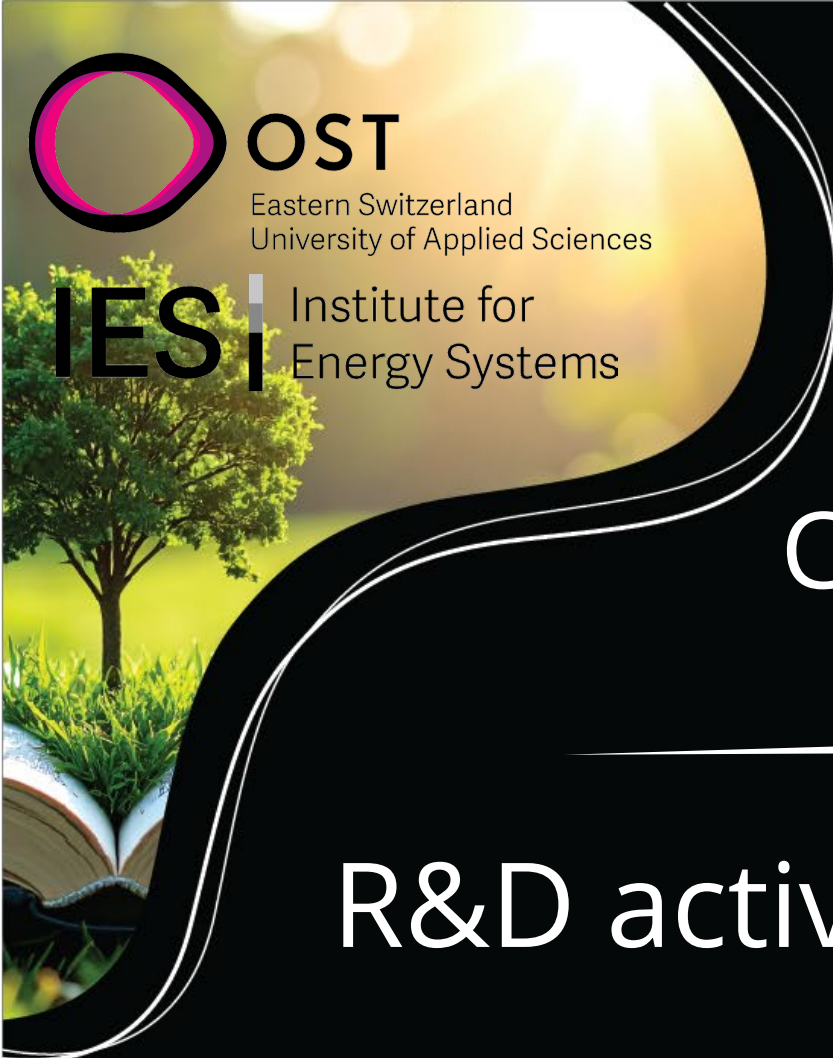


2025

Tor-Martin Tveit



The reverse Stirling cycle applied to steam-generating heat pumps

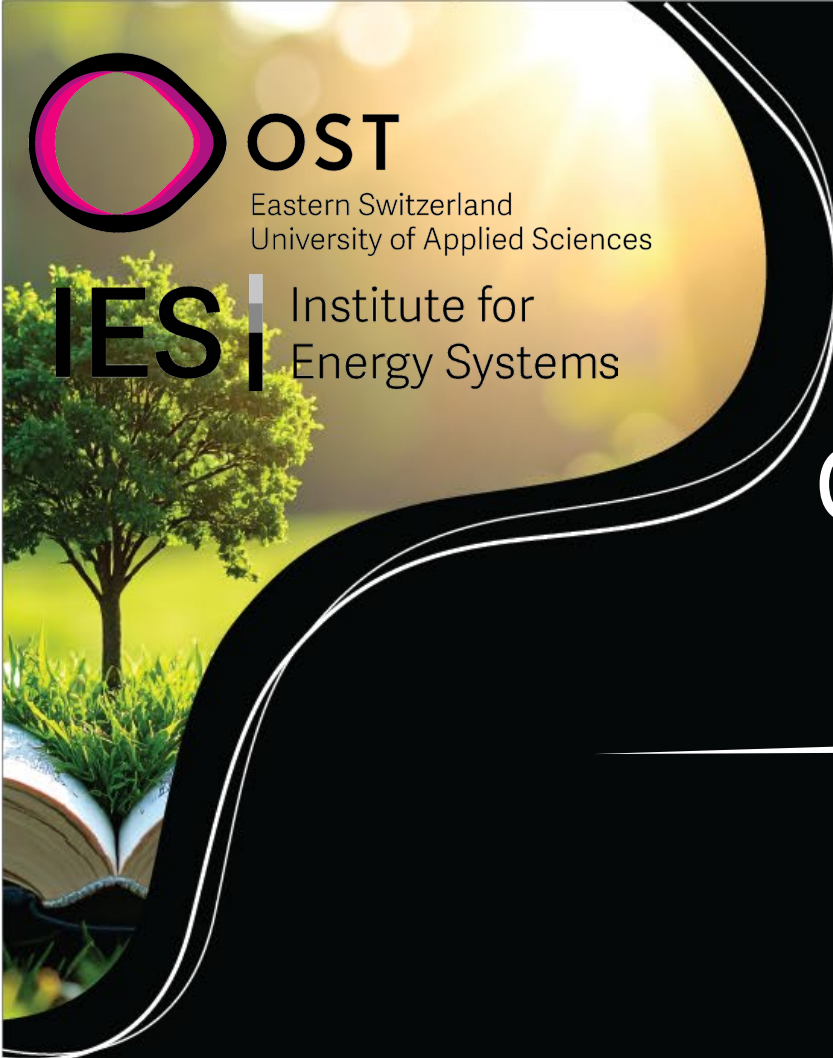


2025

José Luis
Corrales Ciganda



R&D activities of steam-generating heat pumps

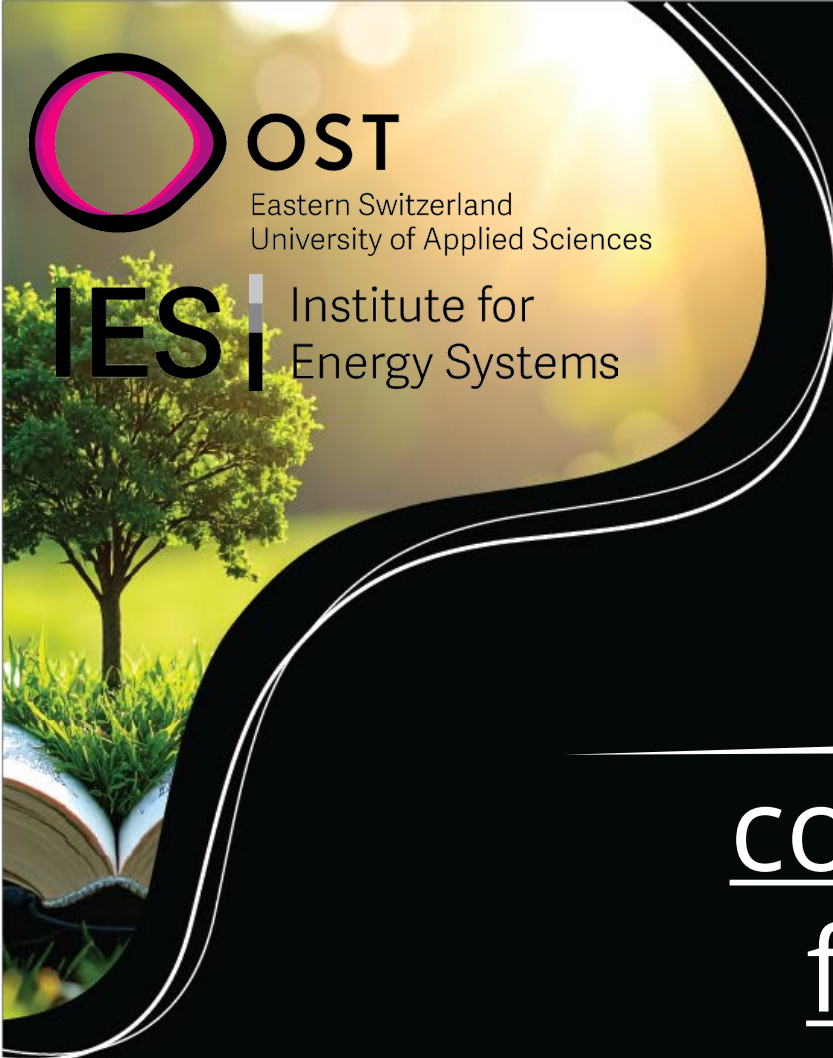


2025

Cordin Arpagaus



Webinar wrap-up



Thank you

cordin.arpagaus@ost.ch
frederic.bless@ost.ch
stefan.bertsch@ost.ch