OST
Eastern Switzerland
University of Applied Sciences

IES | Institute for Energy Systems

2025

Cordin Arpagaus

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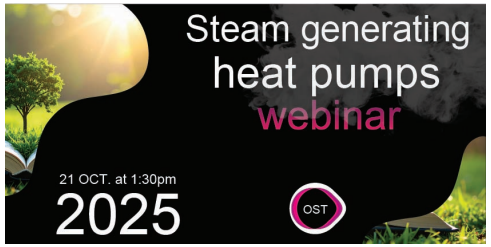
Webinar wrap-up

Wrap-up & Conclusions



Ruzhu Wang

SHANGHAI JIAO TONG UNIVERSITY

- **HTHPs** are key for **industrial heating decarbonization**
- Research focuses on **using water as a refrigerant** in HTHPs
- **Water** is **safe, low-cost, and efficient** at **high temperatures.**
- **Air-source SGHP** prototypes with **twin-screw compressors** and **flash tank design)** proved feasibility with **COP ~ 2** (20 °C air → 120 °C steam) **for liquor processing and electroplating**
- **Large-capacity centrifugal water vapor compressors** are **commercially available**

Guido Sutter

Nestlé®

- **SGHPs** have strong potential in the **food industry**
- The **food industry operates mainly at low temperatures** (41% < 90 °C, 32% 90–150 °C, 5% 150–200 °C, 22% > 200 °C)
- **Manufacturing Masterplan Zero Carbon** promotes energy recycling with the strategy **REDUCE, RETHINK, REPLACE**
- **Heat pump integration examples** (infant formula, confectionery, pet food) show **substantial CO_2 and energy savings**

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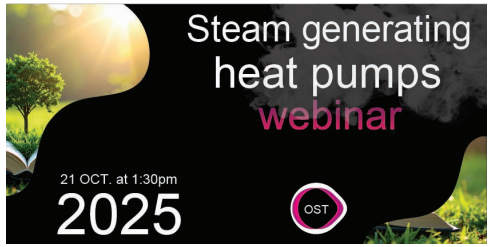
Steam generating heat pumps Webinar 2025

Wrap-up & Conclusions



Abdelmalek Bahri & Peter Kaden

MAYEKAWA MYCOM

- **Mayekawa** (familiy owned business) produces around **6’000 compressors**, with **MYCOM** models widely used in the EU
- **Steam compressors** and **SGHP** are **key technologies**
- **FC-HT (pentane/iso-pentane)** and **M-HT (butane/iso-butane)** heat pumps are used for HT applications (**ATEX-compliant**)
- **Use cases:** Steam supply for **autoclaves** and **pressure cookers** in the food industry, **EU project SPIRIT** (Stella Polaris) uses an **ammonia system** with economizers providing **simultaneous heating and cooling**

Davide Rizzi

clean energy ahead
TURBODEN®

- **Turboden** is a global leader in ORC systems and **turbo SGHP & MVR**
- Offers a **full portfolio** for **large-scale, high-temperature** applications
- Provides **multi-stage compressor designs**
- Ongoing R&D includes **compact steam compressor pilot testing (Q1/2026) and LHP hermetic/Mitsubishi SGHP technologies**
- Operates a **test facility in Italy** with **reference plants**, e.g., a **12 MW paper mill (20 t/h steam, COP = 2, iso-butane).**

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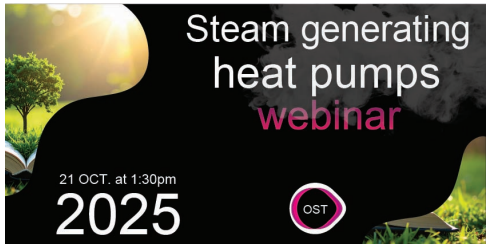

Stefan Bertsch

OST Eastern Switzerland University of Applied Sciences

IES Institute for Energy Systems

- **HTHP market is expanding** (50 products > 100 °C in 2024)
- **Energy analysis** using the **pinch method** helps identify opportunities
- **Technical standardization** of steam compressors and **supportive policies** (derisking, regulations, demonstration projects) are crucial for increasing the **spread of SGHPs**
- Education, training, open data, cost estimation tools, and matchmaking events **accelerate adoption**

André Bechem

HEATEN

- **Heaten** product portfolio includes **HBL4** (4 cylinders, 0.8-2.5 MW) and **HBL16** (16 cylinders, 3.2 to 10 MW)
- **Strategic Partnerships** with **ADVENT** and **INNIO**
- **Hardware compatible** with **HC** (hydrocarbons) **and HFO** (hydrofluorolefins)
- **Reference applications** implemented in **Food, Pulp & Paper,** and **District heating** sectors

Steam generating heat pumps Webinar 2025

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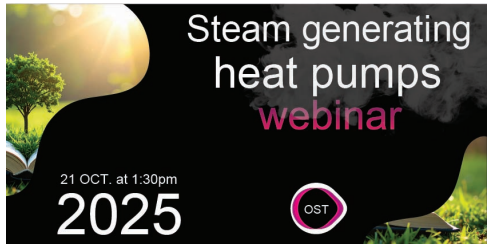

Tor-Martin Tveit

OLVONDO TECHNOLOGY

- **Reverse Stirling Cycle** applied to SGHP
- **Helium** as working fluid
- **Key advantages = high efficiency at large temperature lifts and the ability to reach high steam temperatures**
- **COP ranges from 1.4 to 2.5** (depending on temperature ranges)
- **Environmental assessment by Life Cycle Analysis (LCA)** is used

José Luis Corrales Ciganda

tecnalia
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

- **Steam Pressure Upgrade Technologies**, including thermocompressor, MVR, and SGHP
- **EU Horizon Project Push2Heat** with focus on electrical-driven **SGHP & MVR**, thermally-driven **absorption heat transformers** (AHT) and **chemical heat transformers**
- **Demo sites** in Germany and Italy for practical demonstration
- **Steam test bench** located at Tecnalia's TERMILAB

Pre-Webinar Survey Results

Goal of the Pre-Webinar Survey:

- Tailor the webinar to participants' interests and experience
- Multiple-choice format (15 questions) with MS Forms
- All responses treated confidentially and presented in anonymized form

- **Survey period: 15 to 20 October 2025**
- **Responses received: 212**
- **Response rate: 29.5%**

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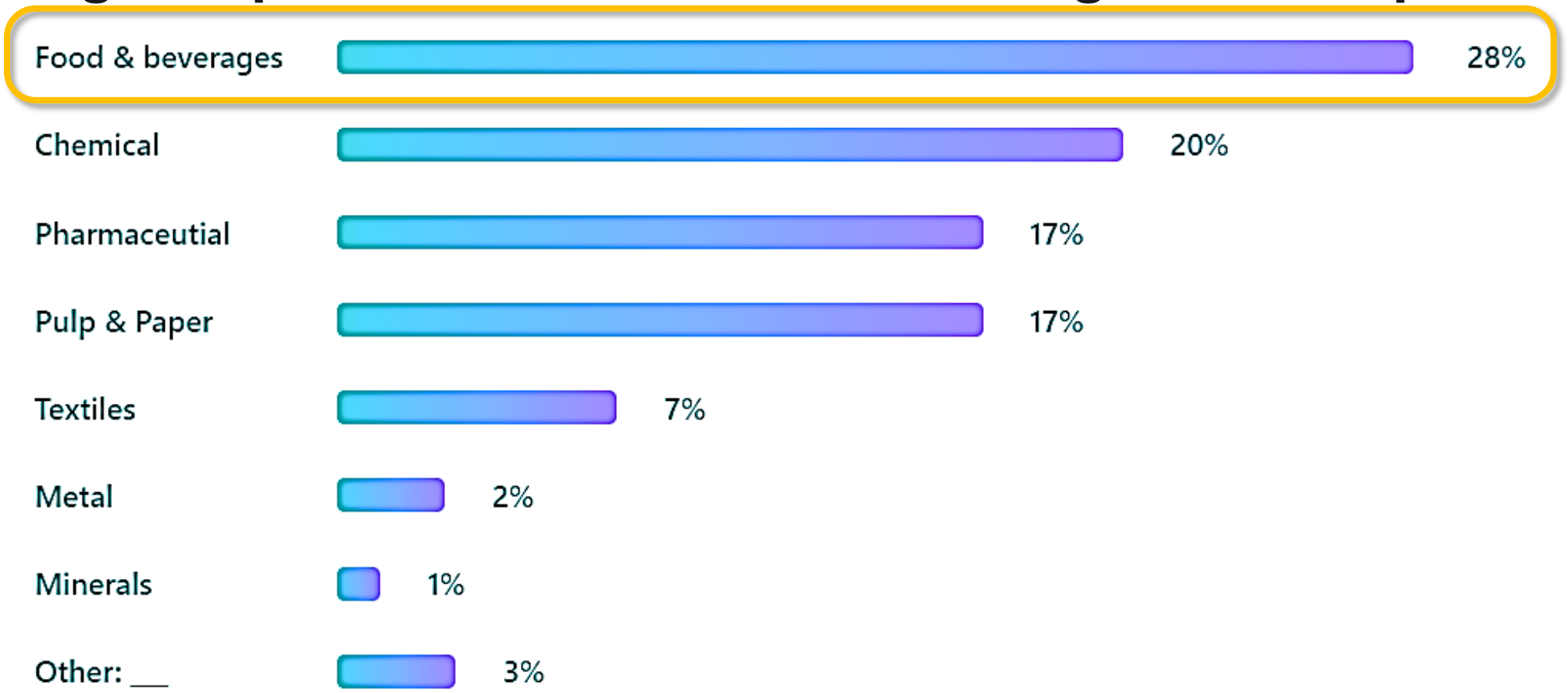
Pre-Webinar Survey Results

Q8: In which industrial sector do you see the highest potential for Steam-Generating Heat Pumps?

(multiple answers possible)

N = 212



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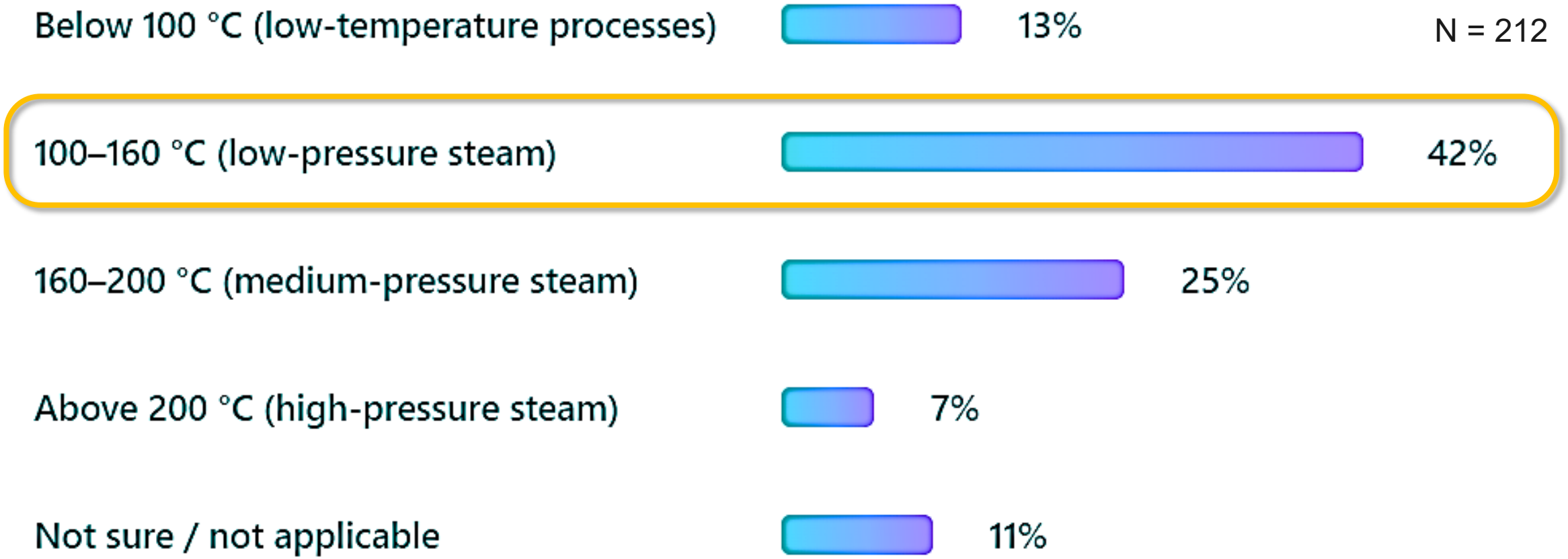
Pre-Webinar Survey Results

Q4: What temperature range is most relevant for your applications? (multiple answers possible)



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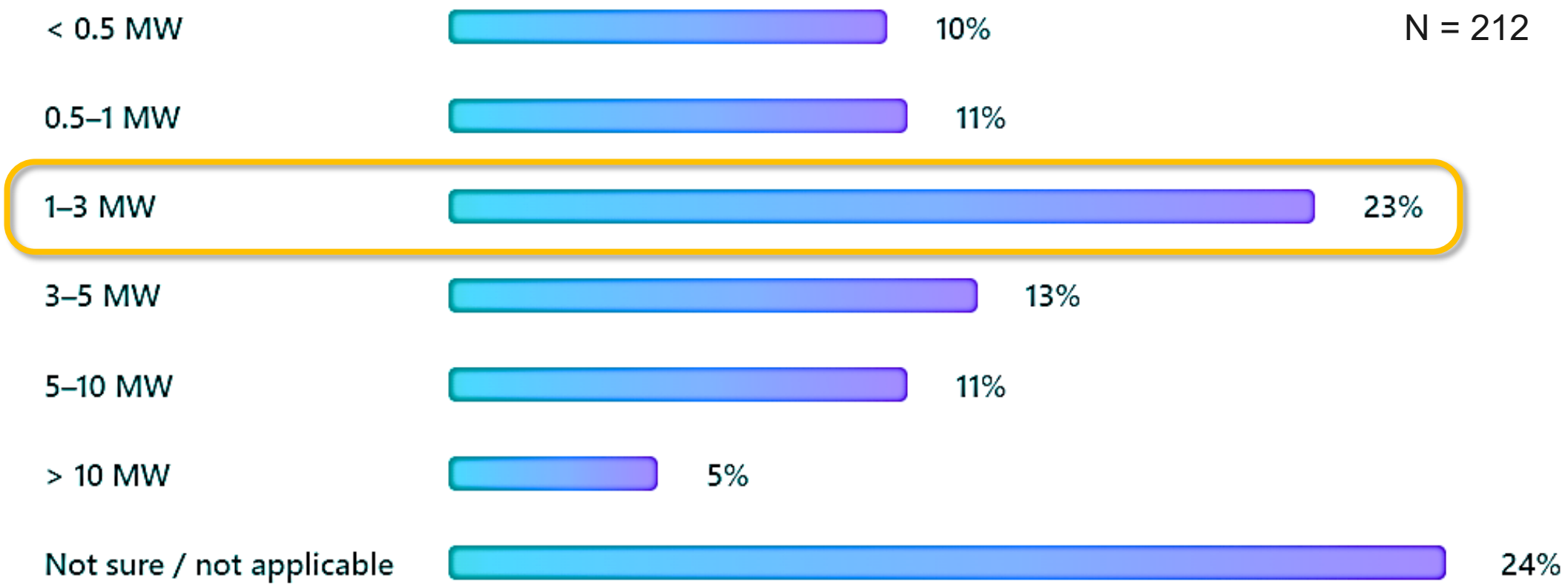
Pre-Webinar Survey Results

Q5: What heating capacity range is most relevant for your applications?



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Thank you

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