EHHPA Project online series - 4th webinar
“Training and re-training all along the value chain”

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HVAC value chain:
New challenges
request
new skills

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What is CEN-CE (https://www.cen-ce.eu/)?

CEN-CE: CEN standard Certified Experts
EU-wide training / qualification scheme based on EPBD mandated CEN standards

H2020 - Project on Construction skills (2018 - 2020) related to

- Reducing energy consumption and carbon footprint
- Market uptake of energy innovation

CEN-CE rational

To reach EU's energy+climate targets, qualified building workforce is needed. Professionals need to be trained on upcoming challenges: (e.g. nZEB, 2050 ready)

CEN-CE set up an EU wide training / qualification scheme
The importance of HVAC professional – key data

- Buildings currently account
  - 40% of Europe’s total energy consumption
  - 36% of its CO₂ emissions
mostly for heating and cooling.

- 35% of EU buildings are over 50 years old, nearly 75% are energy inefficient

- Renovating existing buildings could reduce significantly energy consumption but:
  - only 1.2% of buildings are renovated each year,
  - only 15% incorporate significant energy efficiency improvements.

- Total market share of heating systems in buildings is ~ 20 billion EURO
  (heat emitters account for approx. 12.5% of the total system costs).

HVAC professionals play an important role in energy efficiency update especially in renovation
where HVAC systems are often upgraded first.
HVAC system evolution and new challenges (1/2)
“White collar” workers (designers)

In the past:
• Important was the **dimensioning** (sizing) of heating systems (**kW**) (power of generation, emission, etc)
• **Products** were **characterised** as **products** (not as part of a “system”) at **nominal power** and the **related efficiency**

Now:
• Dimensioning of heating systems is still important but also **energy consumption** is evaluated (**kWh**) to **get the building permit**
  But often the **Evaluation** is more **related to compliance** (fulfil regulations) than to **real performance** (e.g. mostly only monthly calculation methods)
• **Products** are characterised also by **part load** (Ecodesign, ErP), as **part of a “system”**, the building **(Energy Performance of Building Directive)**
HVAC system evolution and new challenges (2/2)

In the future (2020 - 2050)

• **Nearly zero** energy buildings (new buildings after 31 December 2020). (Problem is the definition of nZEB, not harmonised EU wide, 34 regional methods)

• Buildings are no longer energy consumer but also energy producer

• EU CO₂ neutral in 2050 (EU Green Deal), EU funding needs EU comparability

• Avoid a “Building gate” (calculated consumption should be close to real consumption. Evaluation of HVAC systems must be related to real performance)

• Change of systems: from fossil fuels to renewables, more storage, less power, more **complex interacting** systems sensible to boundary conditions (e.g. Heat pumps)

These evolutions and new challenges are already taken into account in the new set of **EPB Standards related to HVAC systems** and taught in **CEN-CE trainings**
Example on new requests: Assessment of energy performance
Evolution of assessment perimeters (assessment boundaries)

Building

Losses products

Needs building

Building + system)

Evolution of perimeters > Building code requirements

Energy Source
“Primary” Energy

Performance indicator of European Directive on buildings

More and more interaction
After the new challenges, the requested **new skills** for the whole HVAC value chain

**Professionals** need to be trained on:
- more **complex HVAC systems** e.g. renewables and storage,
- more **boundary conditions dependent** systems (e.g. heat pumps),
- on **new indicators** (e.g. share of renewable, primary energy, onsite, nearby distant).

**Industrials** need:
- a **common level playing field** for **fair competition** between products for the optimization of buildings energy performance,
- **common databases** and **tools** (HVAC systems are still the weak point in software tools).

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**CEN-CE based on European standards** because they are:
- an advantage for **mutual recognition of qualifications** among EU Member States (qualification and training should be recognized EU wide)
- key to create a **level playing field for products**

A **first EU-wide qualification and training scheme** based on **EPBD mandated CEN standards** for HVAC professionals has been created (**CEN-CE: https://www.cen-ce.eu/**)
Content of CEN-CE training (1/4)
Recall of General structure of building energy assessment

Evolution of perimeters > Building code requirements

Building needs → System losses → Delivered energy → Primary energy, CO₂, emission

Calculation direction: from the needs to the source

Energy losses inside the building are calculated explicitly (emission, distribution, generation)

Energy losses outside the building and related emissions are taken into account in the primary energy factor and CO₂ emission coefficient
Content of CEN-CE training (2/4)
CEN-CE background information on each standard

CEN-CE in a nutshell
Johann ZIRNGIBL

29/10/2020
Content of CEN-CE training (3/4)

CEN-CE spread sheets for parameter analysis
Content of CEN-CE training (4/4)

CEN-CE training platform

Figure 1. List of standards for CEN-CE training an example of CEN-CE certificate.

Figure 2: Opening page of the CEN-CE learning and certification platform
The CEN-CE outcomes (resume)

FOR BUILDING PROFESSIONALS, INDUSTRIALS

• gain recognition for performance, comparability, reliability by using best know-how based on European standards,

• harmonized procedures (training, tools) allowing professionals to work EU wide (target)

• harmonized databases (industrials, building owners)

• a coherent and transparent level playing field (technology neutral in Energy performance assessment of buildings).

To reach EU's energy and climate targets, a qualified building workforce is needed. HVAC Professionals need to be trained on new upcoming challenges: This training should be harmonized on EU level to be recognized in all EU
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