



CONCERTED ACTION
**ENERGY PERFORMANCE
OF BUILDINGS**

CA EPBD – Heating & Cooling Experience

CAEED PM - Session 2 - efficiency and de-carbonisation of H&C

Sophie Schnapp

Coordinator's Assistant of the CA EPBD

In collaboration w/ Susanne Geissler (CT3) & Chris Hughes (CT1)

CT 1 - New Nearly Zero Energy Buildings

CT 3 - Existing Buildings



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CAEPBD - how we consider H&C efficiency criteria compared to other policy criteria - RES, buildings energy performance, CO₂, etc?



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NEW BUILDINGS

More than 1 indicator is required:

Energy efficiency principle comes first

1. Next how efficient can the heating or cooling system in the building be? Indicators for heating and cooling efficiency needed.
2. Can onsite renewables be used? Indicator for renewable energy needed.
3. Is building level community heating available?
4. Is district heating available?

**NO1 INDICATOR:
ENERGY EFFICIENCY FIRST PRINCIPLE**

Note: main parameters to meet building code for individual buildings are primary energy, CO₂ and renewable energy – some countries will have an explicit requirement in terms of % of RE others primary energy per m² not to exceed a specific amount, others will say you need to get the CO₂ reduced to a certain level, some codes will require for a mixture of indicators

CAEPBD - how we consider H&C efficiency criteria compared to other policy criteria - RES, buildings energy performance, CO₂, etc?



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EXISTING BUILDINGS

We would have to differentiate between buildings connected to district heating/cooling systems and buildings which are not connected.

Buildings NOT connected

Criteria/indicators are all important but for different application areas

Business economics:

- FINAL ENERGY CRITERIA - H&C efficiency criteria reflect the final energy demand directly relate with (reduction of) energy expenses of a household or business – final energy demand for H&C is displayed in the EPC – expressing the kWh that are paid for
- RES production criterion also important because it relates with potential income.
- Towards the future: CO₂ trading included building sector

National economy: CO₂, building energy performance, primary energy

Buildings connected

- With CO₂ emission factors there is a range of discretion region dependant – there is a political factor that will determine the emission factor- although there are factors in the annex each country may interpret these differently
 - Decarbonisation of H&C by fuel change (district heating / cooling system) – if we change from gas to biomass or biomass to solar thermal these will give us different CO₂ emission factors
- If we have a CO₂ free H&C supply then there is no need to improve energy efficiency of the building envelope **in theory**; this can be a solution to a specific type of building, e.g. buildings under a kind of monument protection however, there are 2 situations:
 - 1- protected buildings that are not allowed to be renovated from the outside – for these buildings decarbonisation of H&C supply is a good option.
 - 2- the classic building - the envelope can be altered – here a cost-analysis of solution can be undertaken –decarbonise both envelope and H&C supply or only H&C supply
- This will depend on cost-optimality – is it cheaper to invest in the decarbonisation of the envelope or cheaper to invest in the district H&C system – size of energy demand – how many MW does the area need from the supply side?
- For district heating and cooling an obligation to connect with the network would be helpful- if 100% of the buildings had to connect it would be more profitable for the community.

In which direction we should look for "optimal combination" of different criteria?



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Keep energy efficiency criteria at final energy demand level according to the principle "energy efficiency first"

NEW + EXISTING BUILDINGS:

- All criteria should be displayed, aggregation does not make much sense because different indicators address different target groups – **must avoid going only for primary energy and/or CO₂ alone**
- For each building there will be a point where it is better to connect to a group of other buildings for heating / cooling / renewable energy sources, if possible.
- Move from sustainable energy buildings to sustainable energy communities.

Good practice examples



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AUSTRIA

There is an initiative for energy spatial planning in the provinces of Styria and Lower Austria that deals with looking at whether it is better to connect to a group of buildings or as a single building

They use highly disaggregated statistical data for e.g. identifying priority areas for district heating systems (based on renewables) in small villages.

Information available here: <https://www.verwaltung.steiermark.at/cms/ziel/144381826/DE/>

IRELAND

In Ireland there are backstop or maximum allowable U-Values for the building fabric. In practice buildings will need to use lower than the maximum values. When building areas are combined with U Values and Ventilation (chimneys, flues, mechanical ventilation method installed) then possible to calculate Heat Loss Indicator – HLI units W/m²/K

$(\text{Fabric heat loss} + \text{ventilation heat loss}) / \text{Floor area} = \text{HLI W/m}^2\text{K}$

The lower the value the better

Generally, heat pump should not be installed if value is greater than 2.3 in Ireland. Ideally the value is 2.0 or less

KEY POINTS // CONCLUSIONS



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- **Single building approach vs community buildings approach**
 - Differentiation when we are building a new building / community:
 - Baseline to know what is the availability of RES in the area or on-site and which approach (community based or individual building based H&C plans) is cost-optimal, based on RES availability?
- **Indicators at different levels as they address different target groups**
 - Nations, business or household target groups respond to different indicators
 - When we talk about community based systems we are dealing with municipalities and they will have a different set of requirements / criteria
- **Challenge in some countries – different ministerial departments handle single building scale (energy policy) and community scale (spatial planning)**
 - On a building level we deal with real estate sector – energy language is not in line with energy policy makers
 - A community based system we interfere with the spatial planning policies – totally different departments often
- **The challenge and focus of the EPBD is RE on site / on the grounds of the building itself to get the benefits of RE - the only benefits of RE further away is through DH**

THANK YOU
FOR YOUR ATTENTION



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