TW1-1

Do we need new gas technologies for the domestic and small commercial space heating market?

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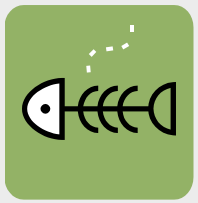
The space heating challenges

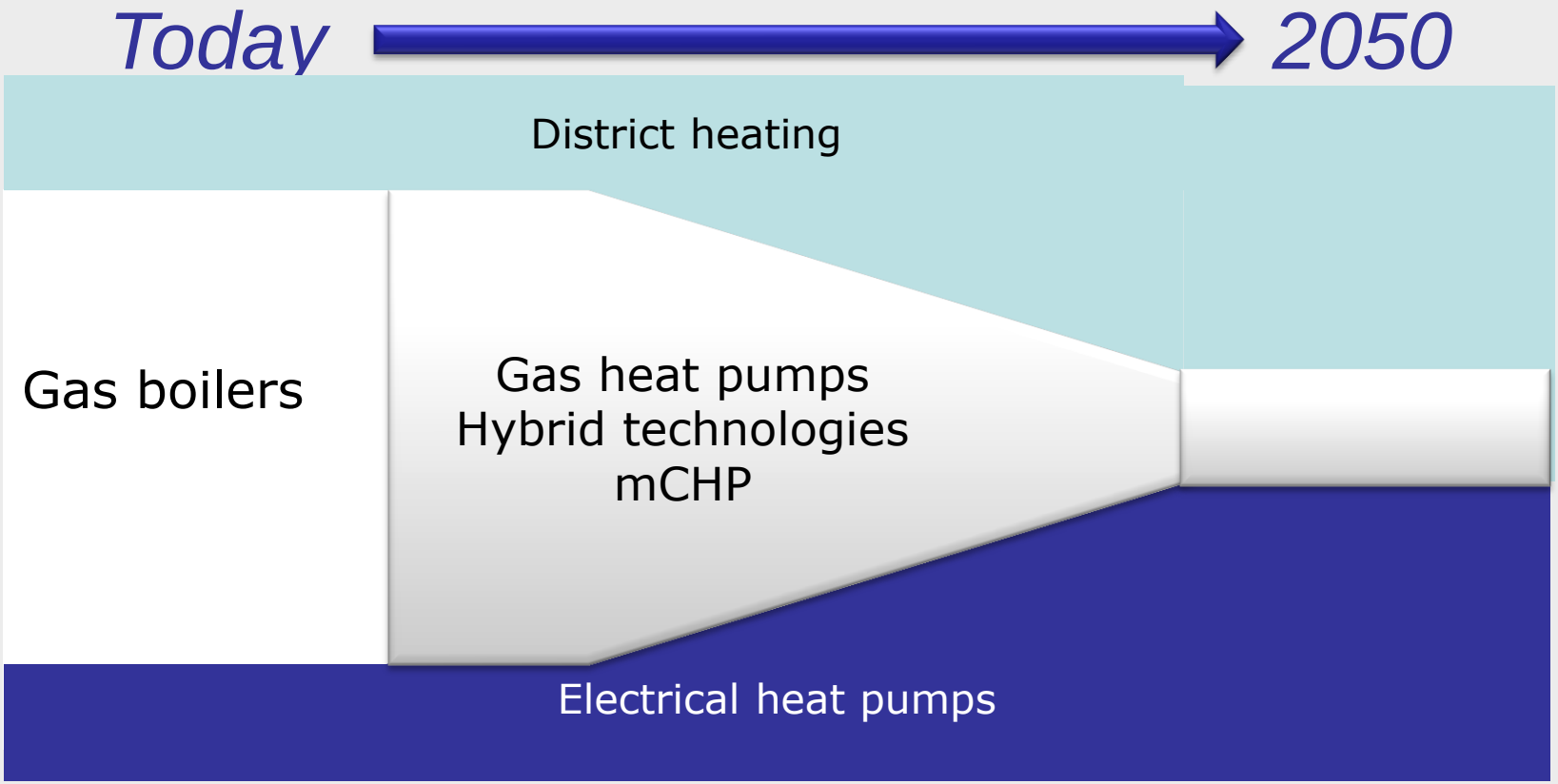
The bad news

The good news



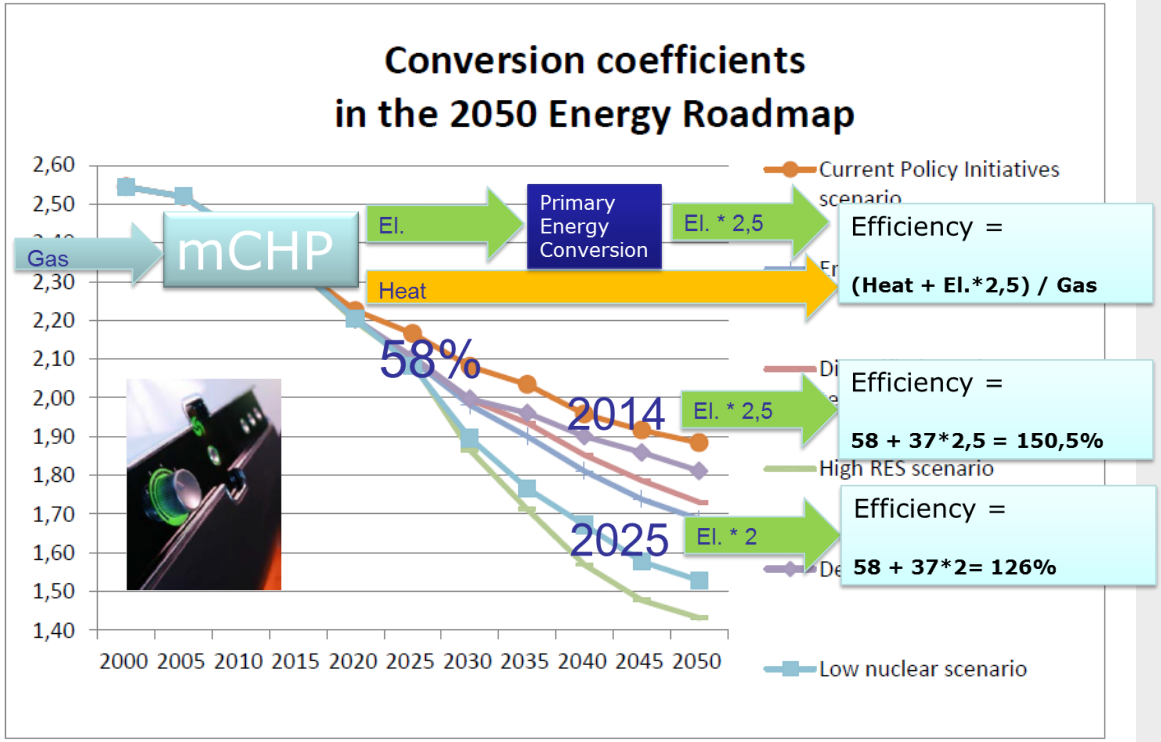
- Natural gas is FOSSILE
  - Phasing out of fossile fuel policy
    - But we still have a lot (can we afford not to use it?)
- Heat demand reduction in houses
  - Infrastructure and heating appliance costs
    - It is the same issue for other competing options for central heating (e.g. EHP)
- Gas quality change
  - Will we be able to harmonize gas/appliances?
    - Harmonization efforts done in EU. Gas sensors.
- New gas technologies
  - Where are they?
    - Hybrid is there; and so is GAHP!

Towards a fossile-free heating market?



Ref. source DELTA

Competition of technologies
Electricity primary conversion factor importance

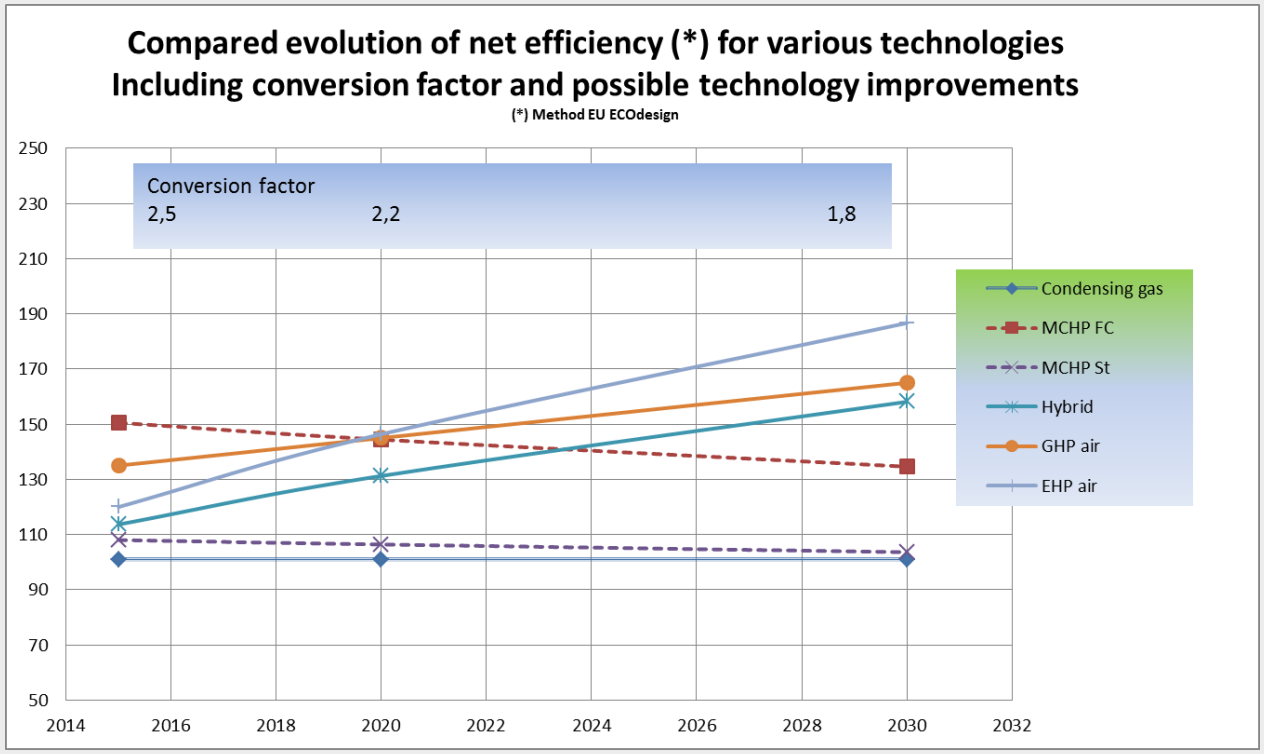


With the development of renewable electricity the **conversion factor will decrease** and as a result:

- mCHP efficiency will decrease
- EHP efficiency will increase

Source Eurelectric

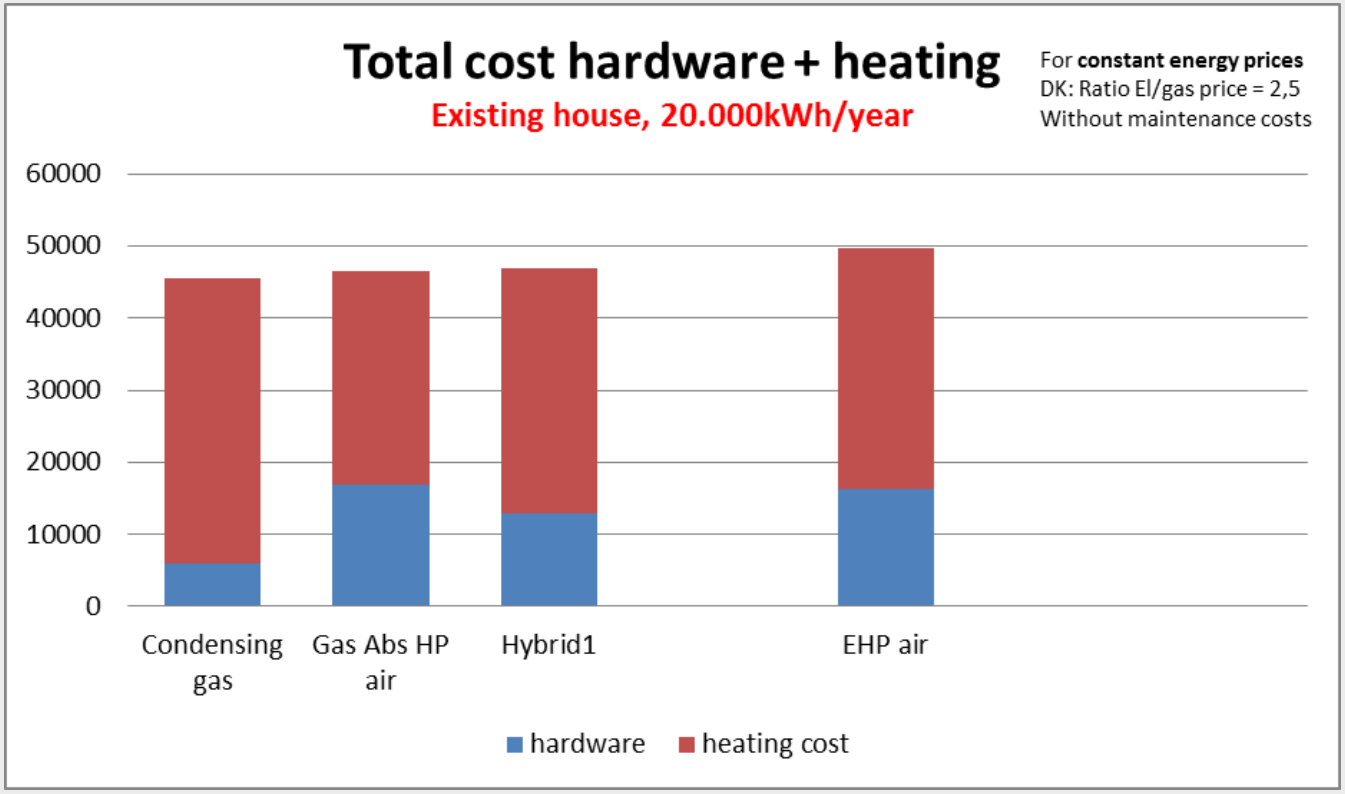
mCHP less and less efficient - EHP more and more efficient!



2020 = turning point

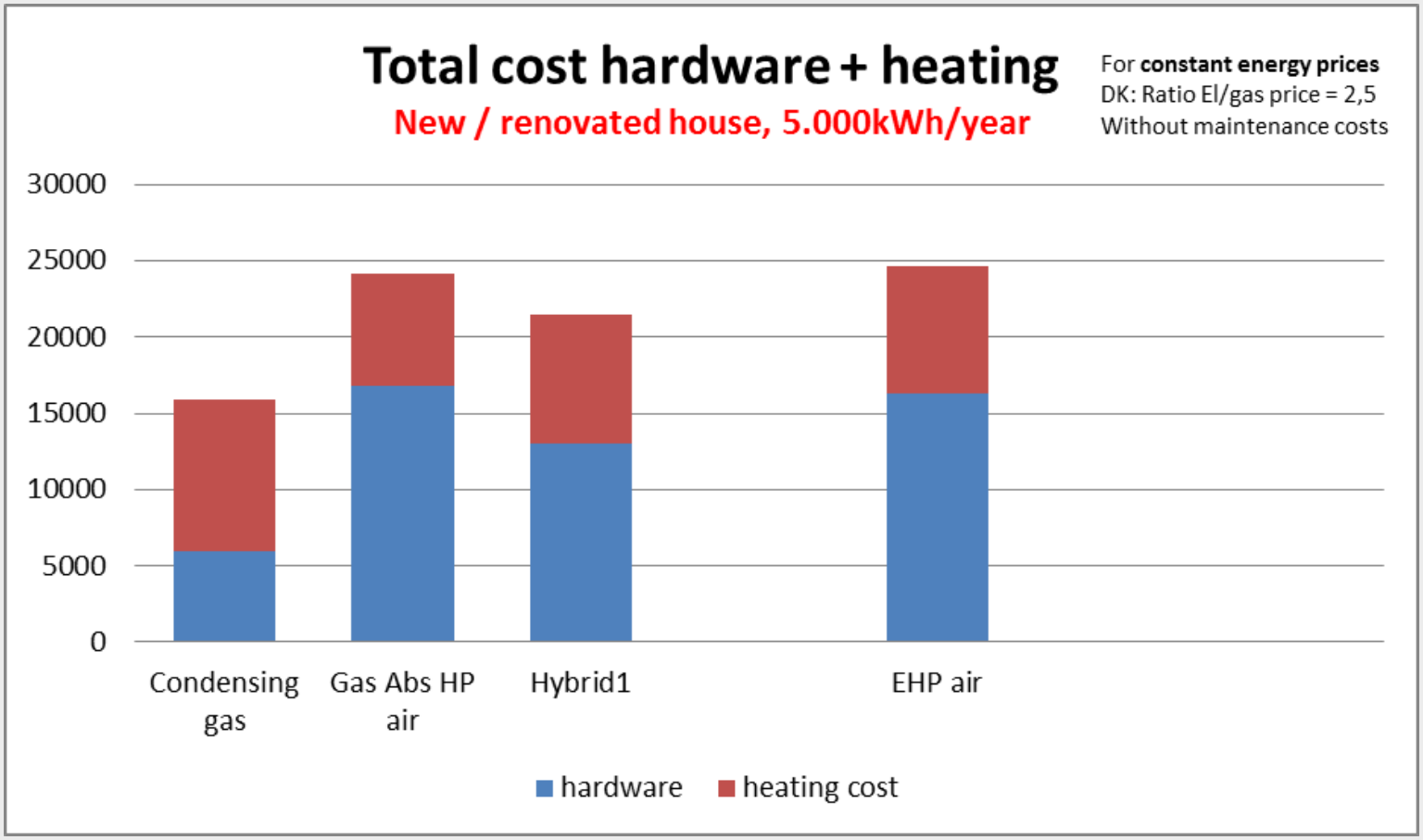
Sources:
- Conversion factors and evolution: *Eurelectric*
- Appliances efficiency: *Danish Energy Agency + DGC*

AVERAGE existing house, today

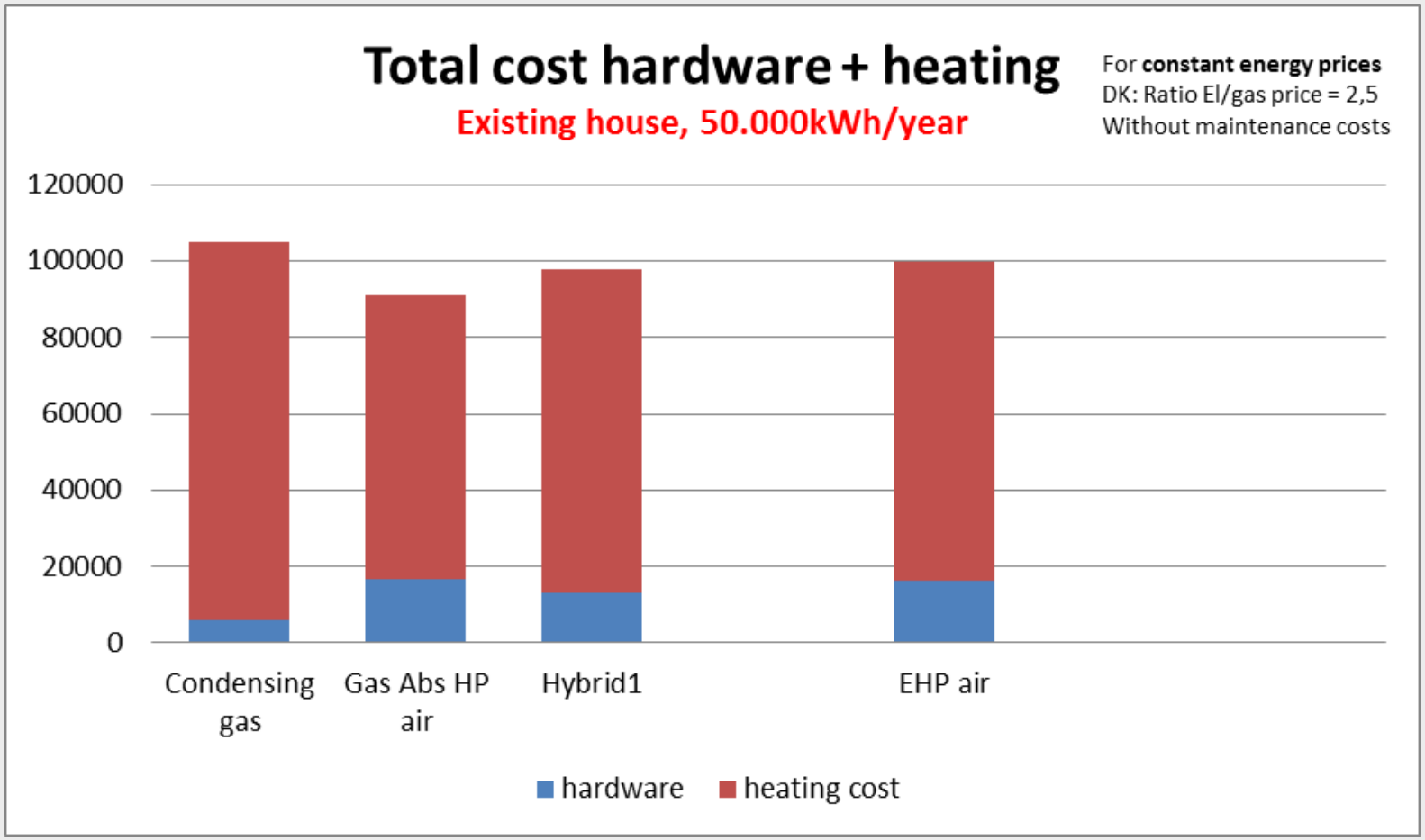


Aggregated costs for 15 years' heating + hardware and installation (DK)
(Costs in Euro)

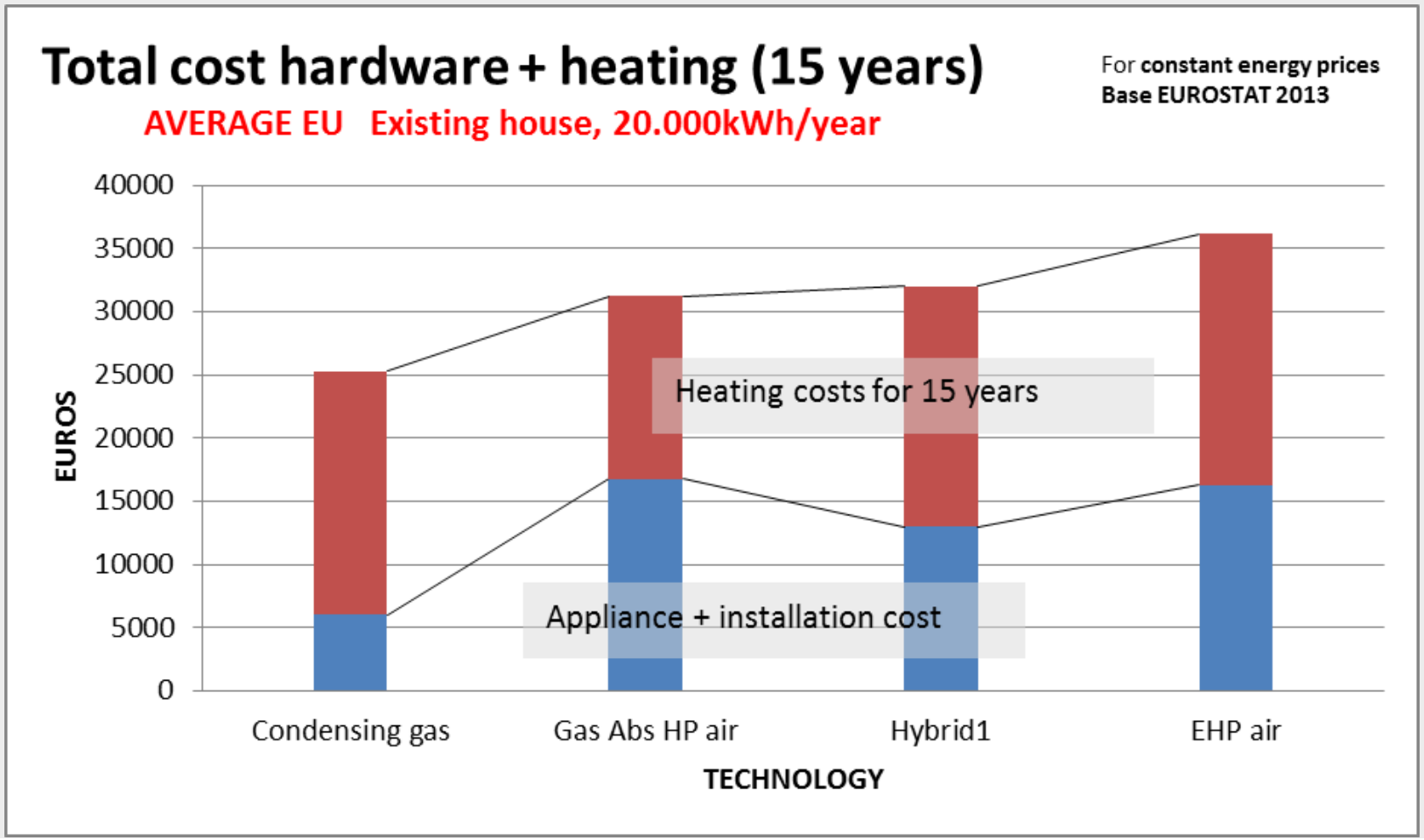
New or renovated house



Commercial market



EU situation AVERAGE USER
(Calculated with hardware same price + EU energy prices)



Conclusions: Technologies

1) **Condensing gas** boilers is the most cost effective technology for the replacement of existing boilers in the domestic sector.

2) Because of the price, **MCHP Stirling** is not good enough to compete with condensing in the domestic sector.

3) **Fuel cell** technologies are coming too late in the domestic sector: It may be adapted to commercial users.

4) **GHP** is an excellent product with low payback time for commercial users, schools etc. Let the technology be known and installed correctly.

5) **GHP** for domestic users: We expect a product that is:
   - Having high efficiency over a wide load range without the need of a backup boiler
   - Reliable
   - Competitive with hybrid.

6) **Hybrid** will have an increasing efficiency (due to **conversion factor evolution)**
   - A good option for small and medium houses
   - The technology of the transition Gas-El.?

Looking forward: we need to be creative

Building envelope

- Low heat demand = **central heating** not competitive.
- **Cheap, but efficient air/air el. heat pumps** as customer choice?
- Why not **gas driven air/air heat pumps**?

From appliances to system

- Not one single technology on the market but **plenty of solutions mixing** and optimizing the use of energies and bringing new services.
- Technologies are to be compatible with **renewable and energy storage**.

New smart thinking

- Technologies can be shared between users to decrease the cost.
- Super users may be energy service providers for their neighbours.
- Appliances may be part of a virtual heat and power plant connected via smart grids.