



## Reduction of the installation costs for domestic gas appliances



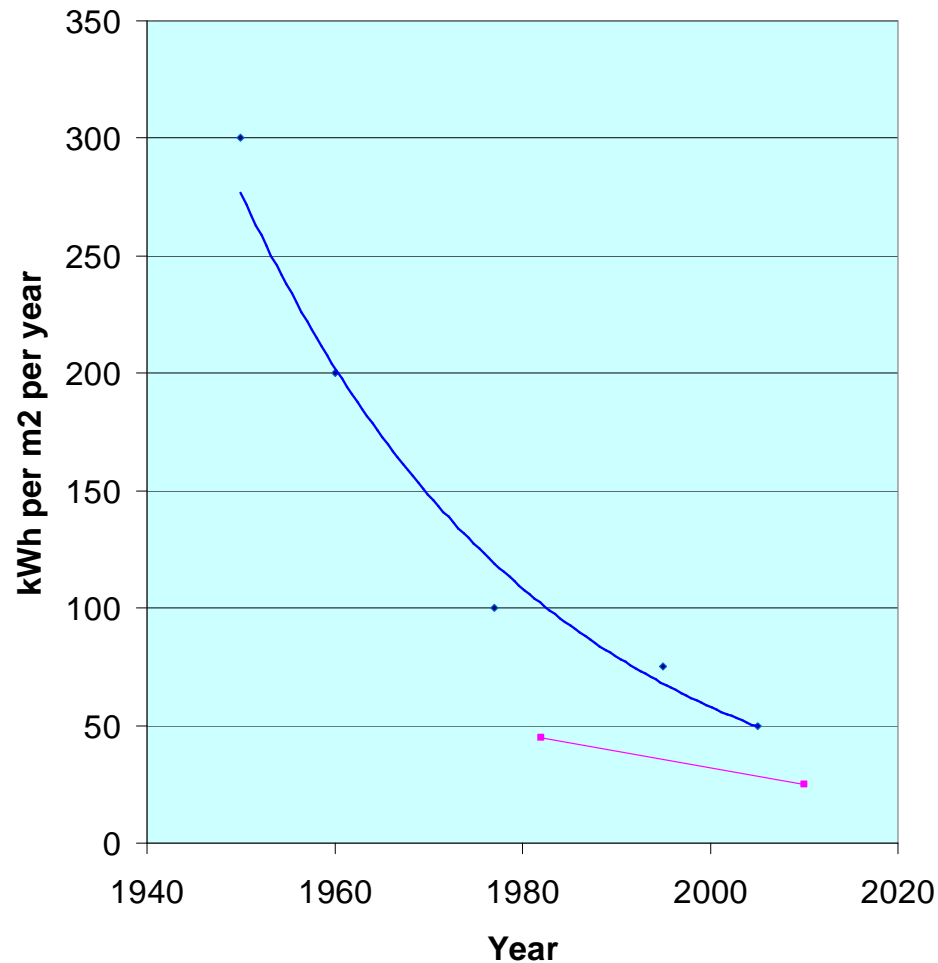
Show house in Leipzig, Germany



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## BACKGROUND: Why do we need to think about installation costs?



- The new EU directives
- The development in heat demand for a houses in Denmark

◆ Standard house  
◆ Lowenergy house



## How can we reduce the costs?

- Smart new hardware and new installations techniques (pipes, connections).
- Reduce labour via new techniques and material.
- Develop new gas applications to lower the relative cost (comparing with the overall gas consumption).

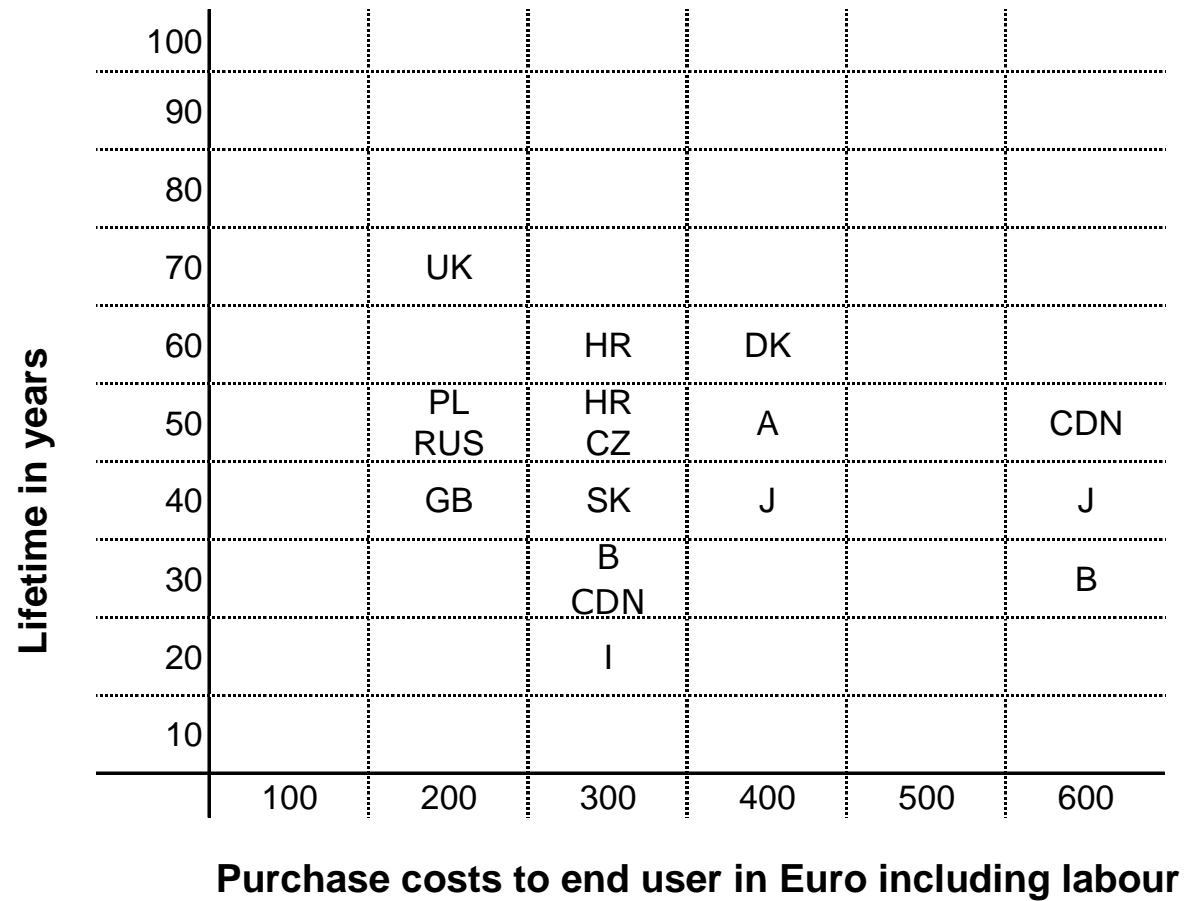


## Collecting and analysing data about the gas installation costs and durability in different countries

|     |                                        |
|-----|----------------------------------------|
| A   | Austria                                |
| B   | Belgium                                |
| CDN | Canada                                 |
| CZ  | Czech Republic                         |
| DK  | Denmark                                |
| GB  | Great Britain                          |
| HR  | Croatia                                |
| I   | Italy (has not answered all questions) |
| J   | Japan (has not answered all questions) |
| PL  | Poland                                 |
| RUS | Russia                                 |
| SK  | Slovakia                               |

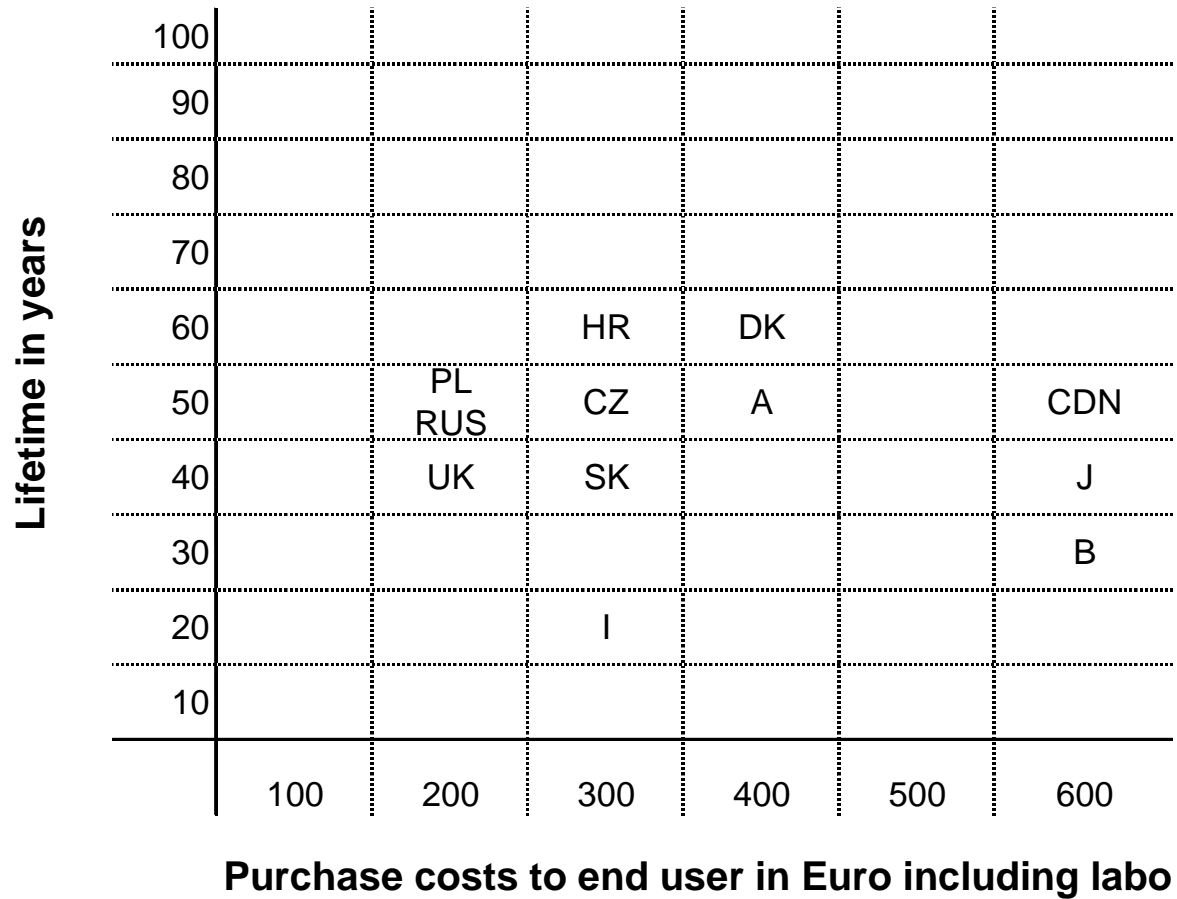


## Service line 25 meter to house (cost for the gas company)



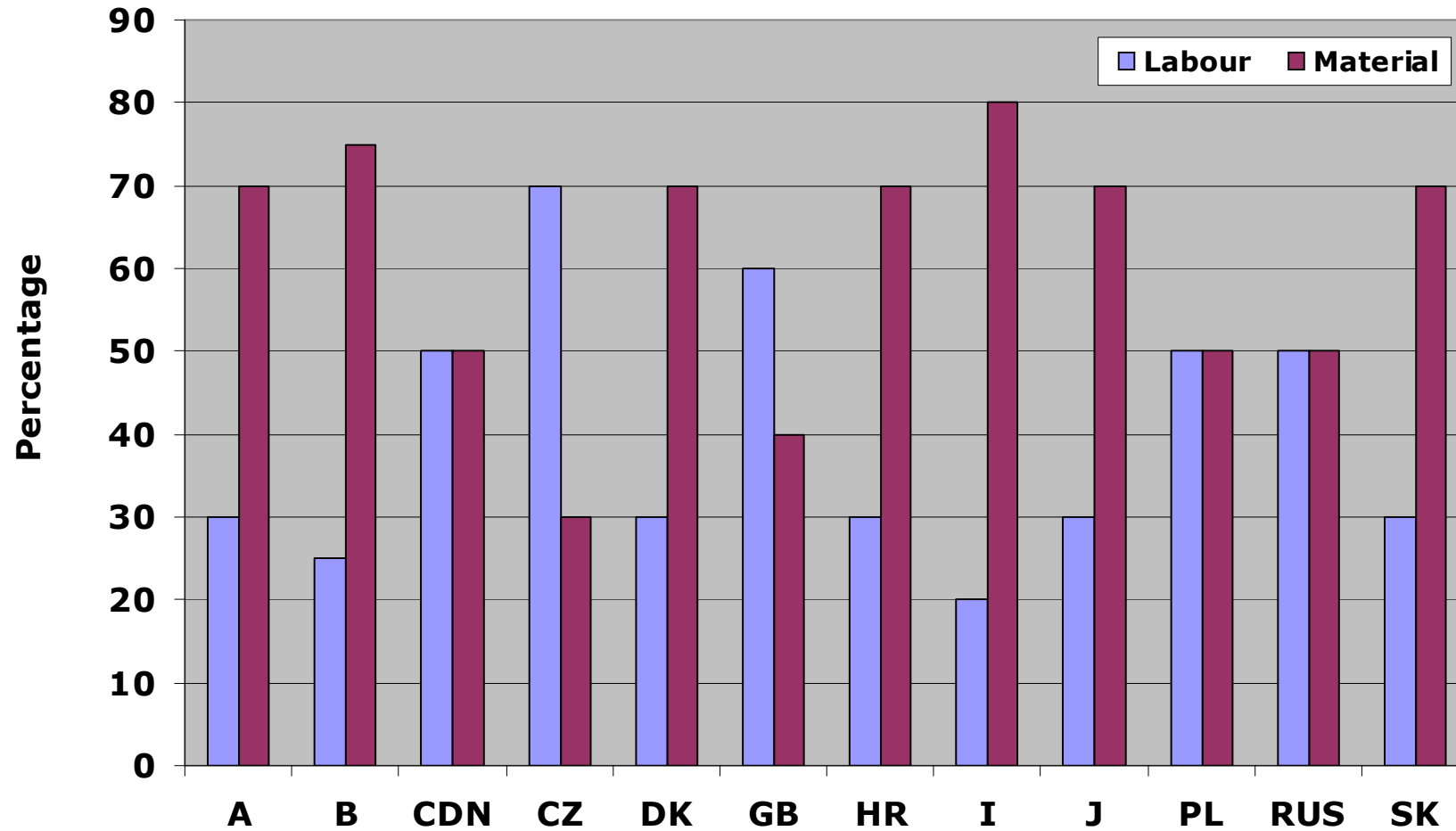


## Pipeline inside houses



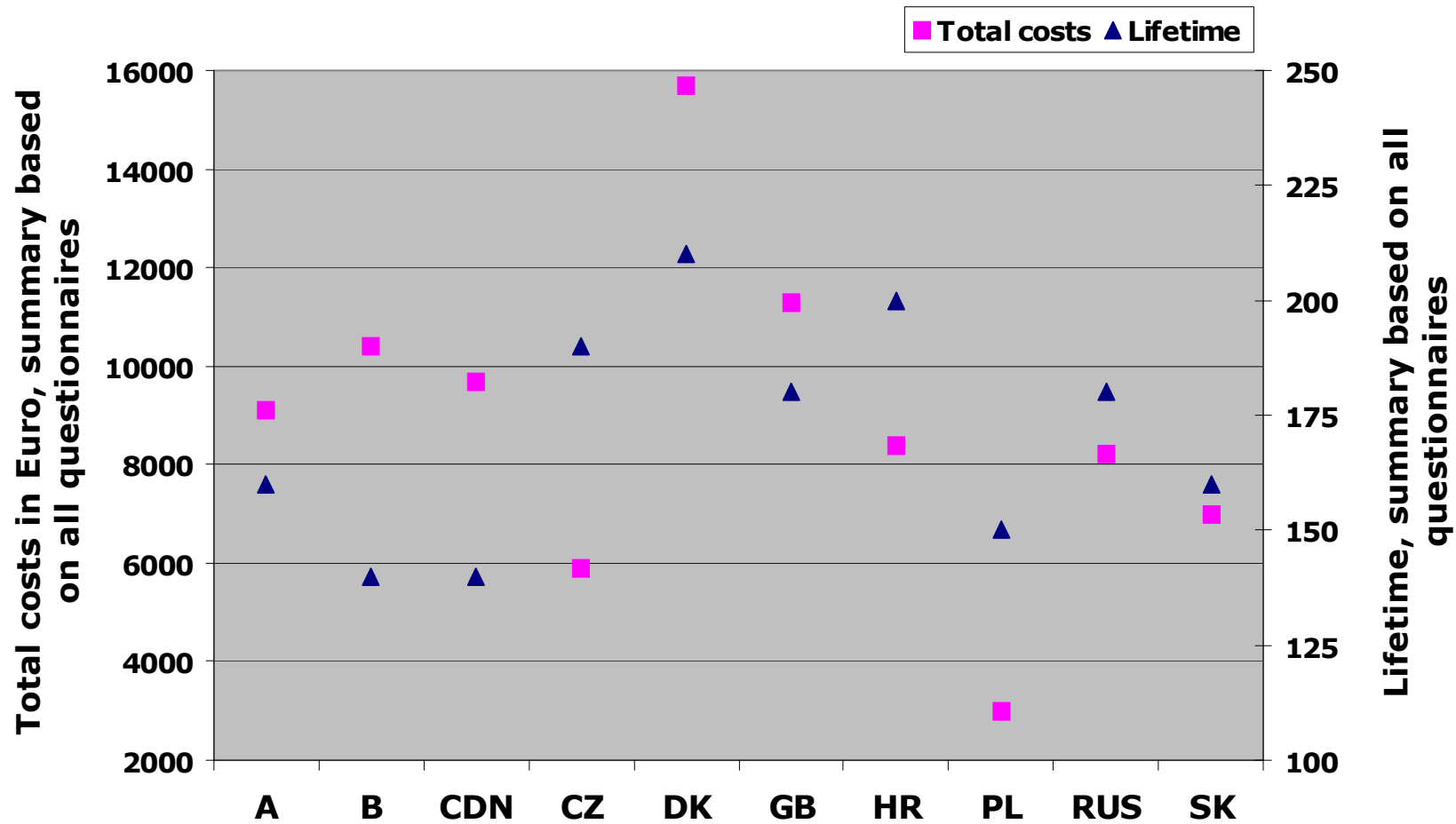


## Labour and material cost in total installations costs





# Correlation between lifetime and investment as an average consideration for the individual countries





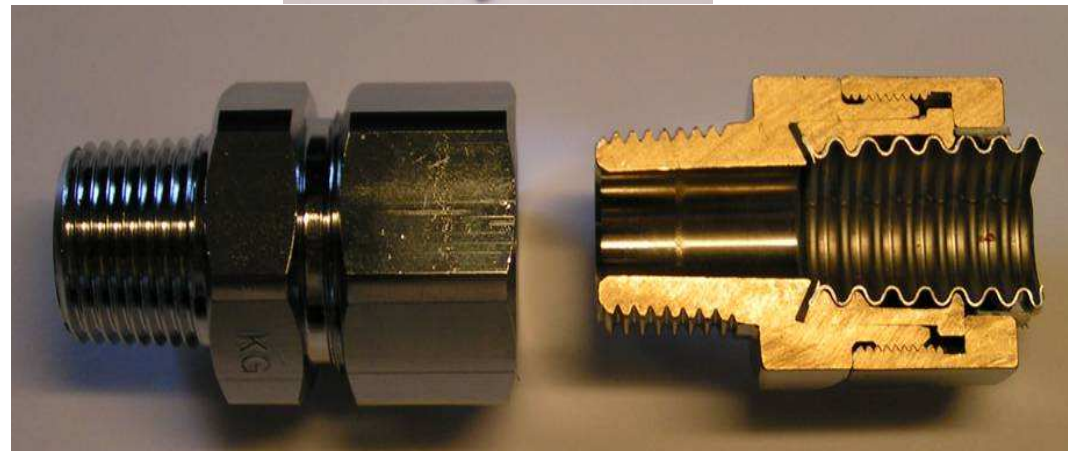
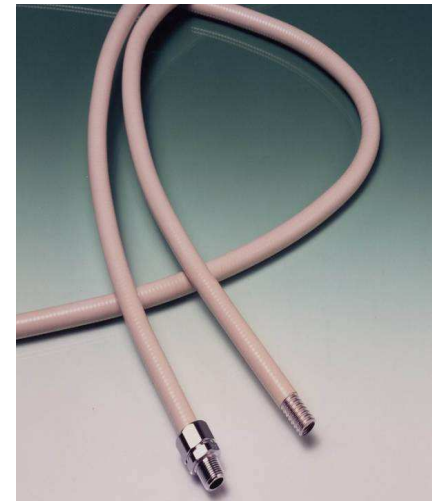


## **New installations techniques to support low-cost gas installations**

- Flexible corrugated stainless steel tubing (CSST)
- Flexible plastic tubing like multi-layer tubing (PEX-Al-PEX )
- Tubing made of cross-linked polyethylene with integrated barrier layer to limit gas diffusion (PEX-EVOH).

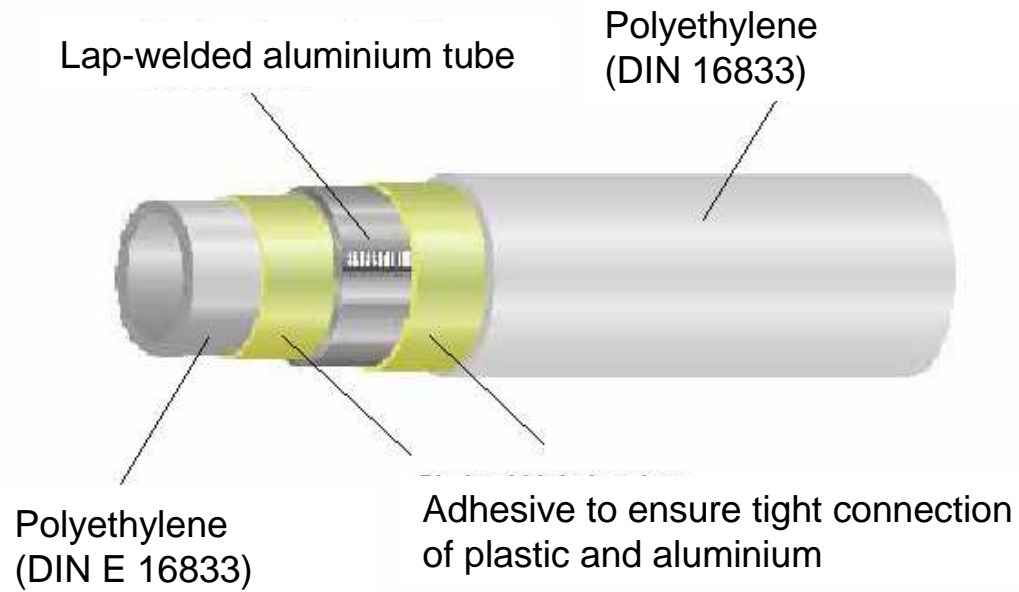


## Flexible corrugated stainless steel tubes (CSST)





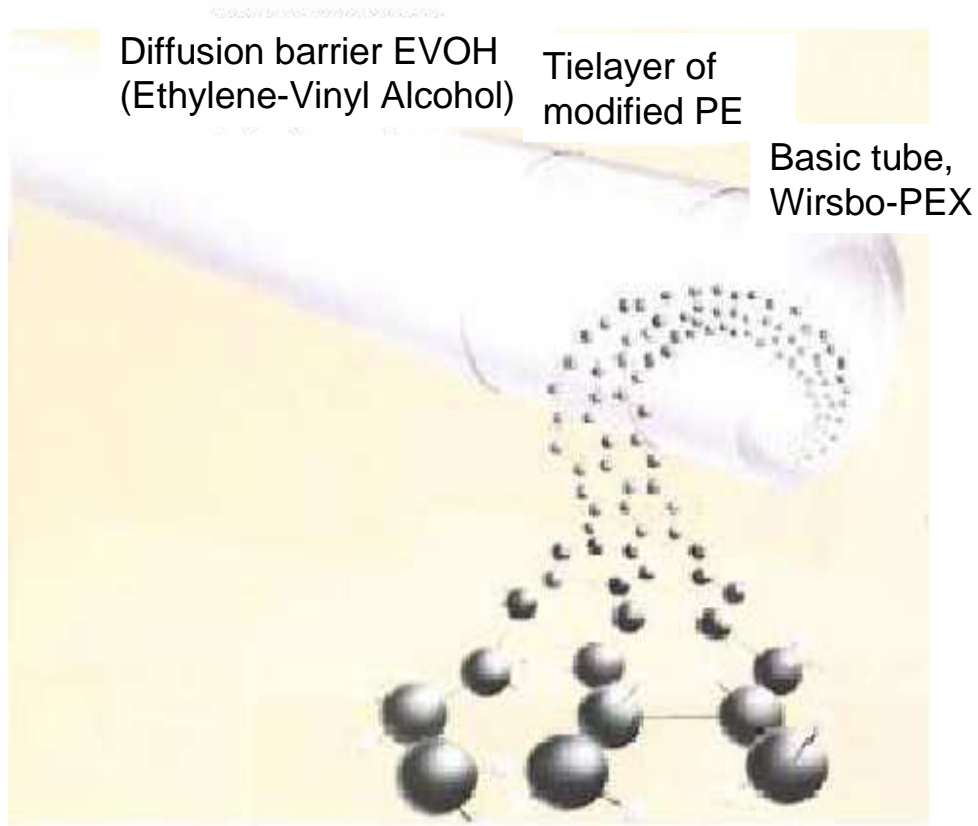
## Flexible plastic tubing with aluminium and press fittings



Copper gas installations with press fittings

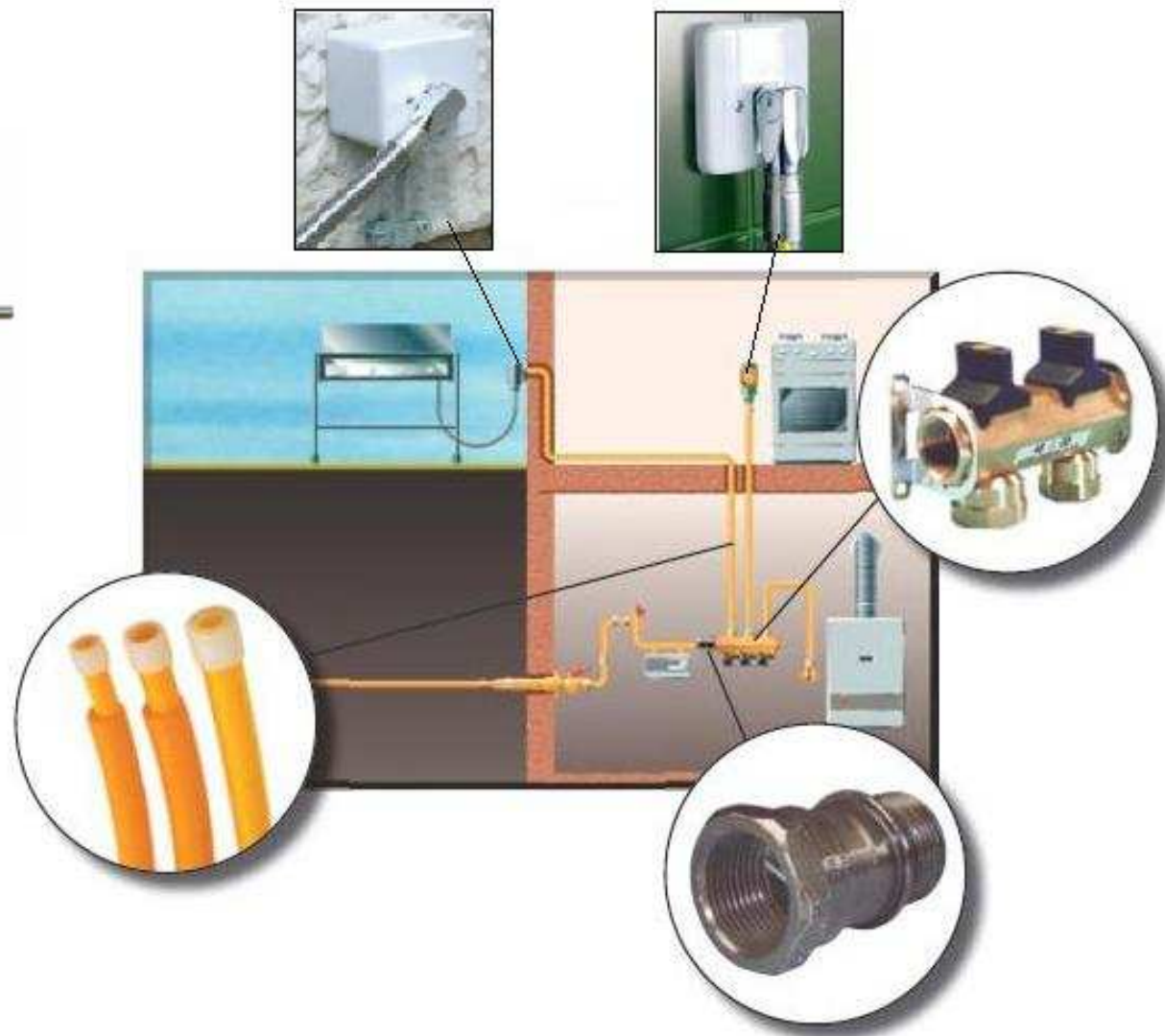
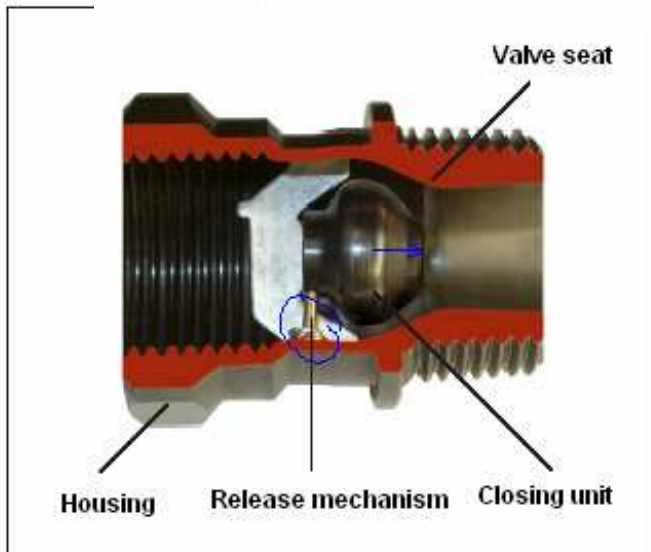
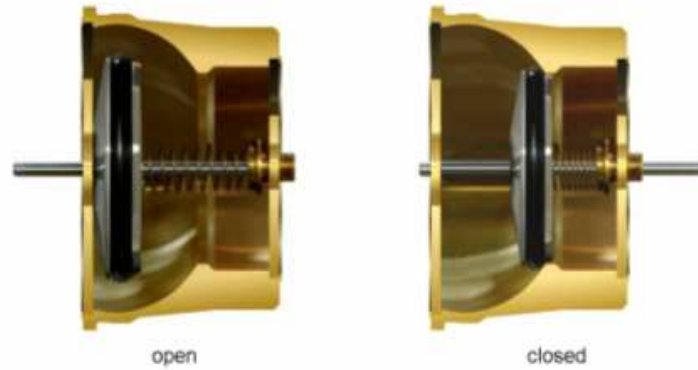


## PEX-EVOH pipe (with integrated barrier layer to limit gas diffusion) with the unique expanding fitting technology



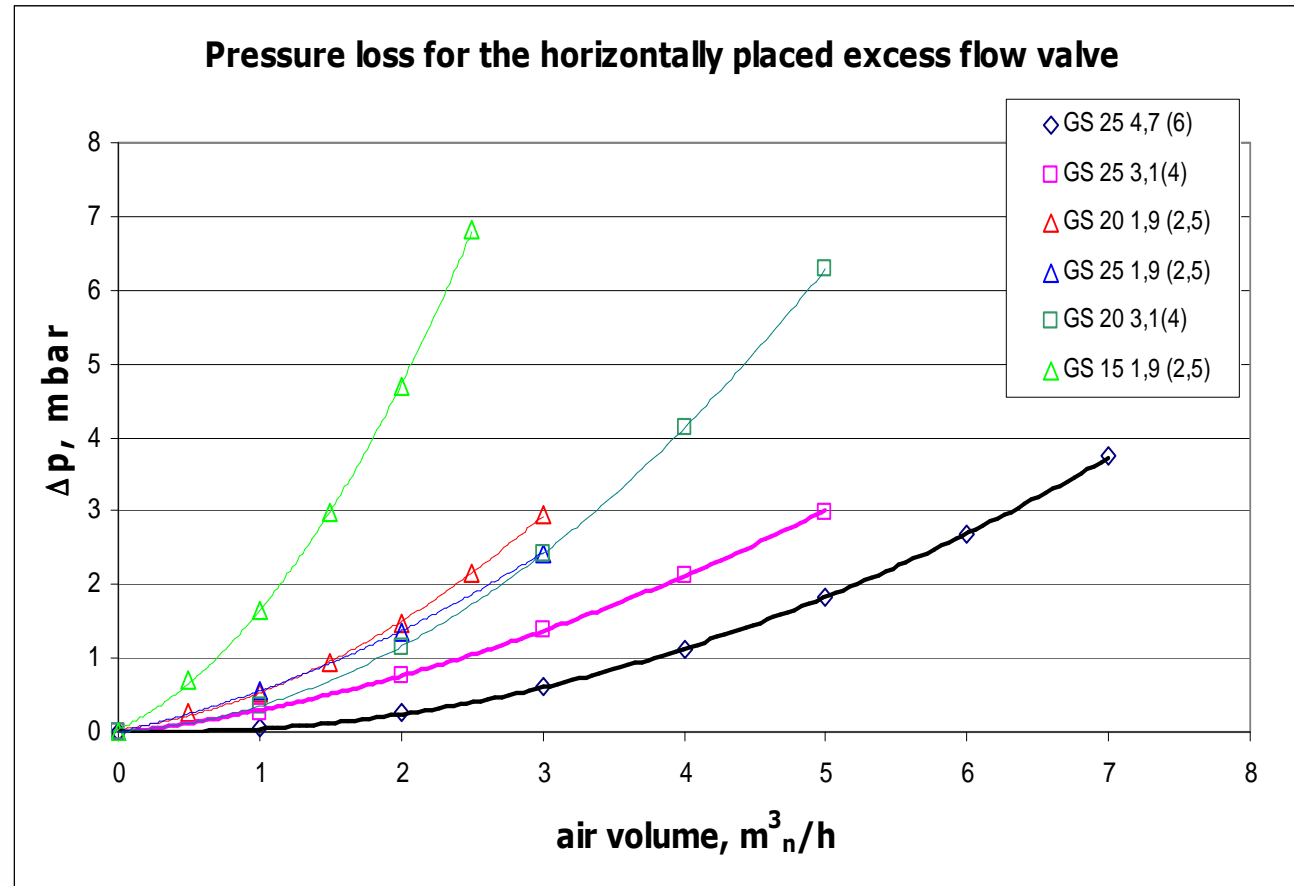
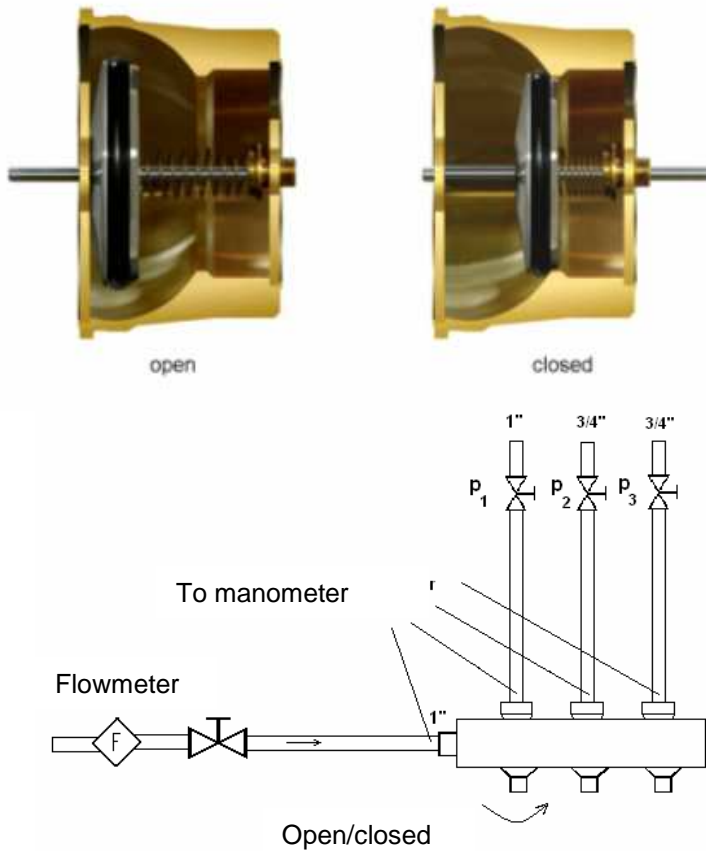


# Safety components



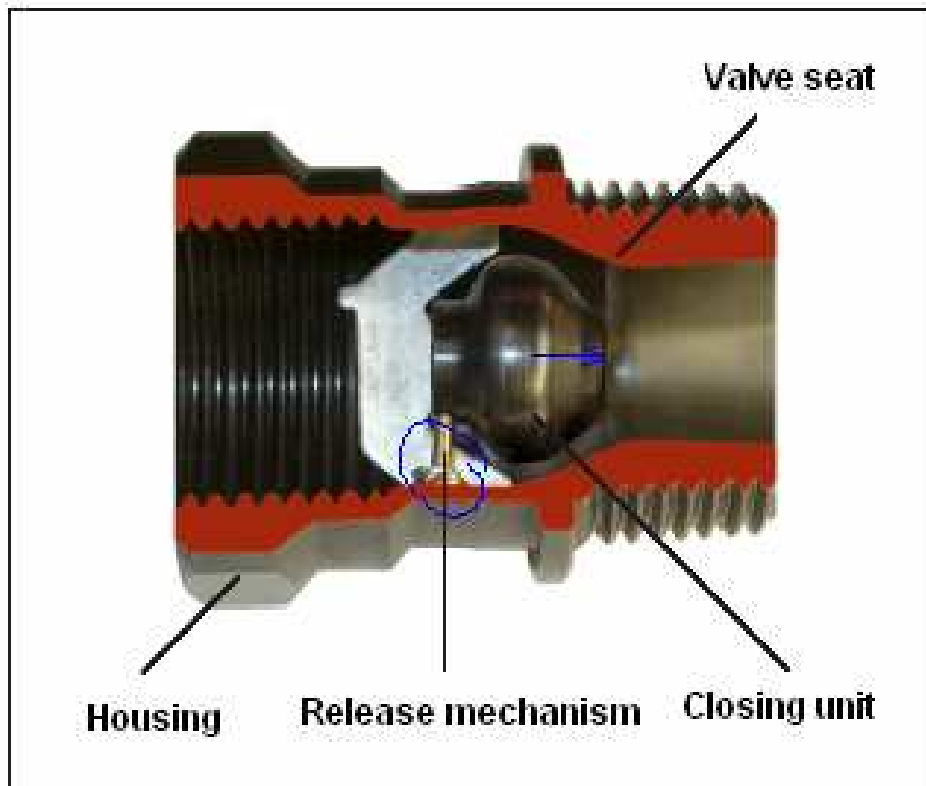


## Some of the test results - excess flow valve





## The thermally activated shut-off device and noise test





## **Conclusion**

### **Results of the IGU study**

- General problems with far too high installation costs
- Due to sharpened building regulations the natural gas consumption will decrease

### **Solutions for the future**

- New easy-to-install piping is available
- New and reliable safety components are available
- New and low-priced installation techniques are available