



Duct Leakage Problems and Consequences in EU

International Webevent Asiepi
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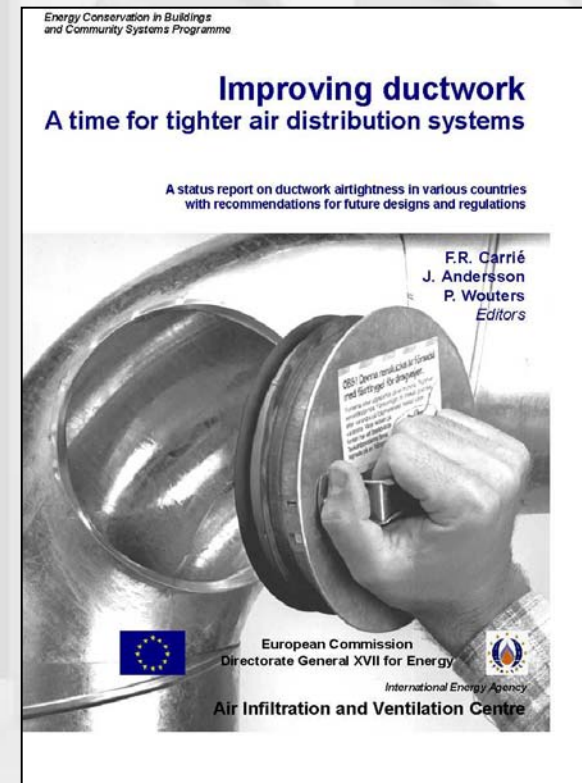
Is airtightness an important issue?

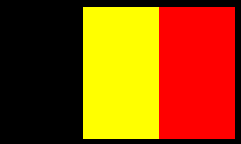
- Often considered as a minor problem
- But...



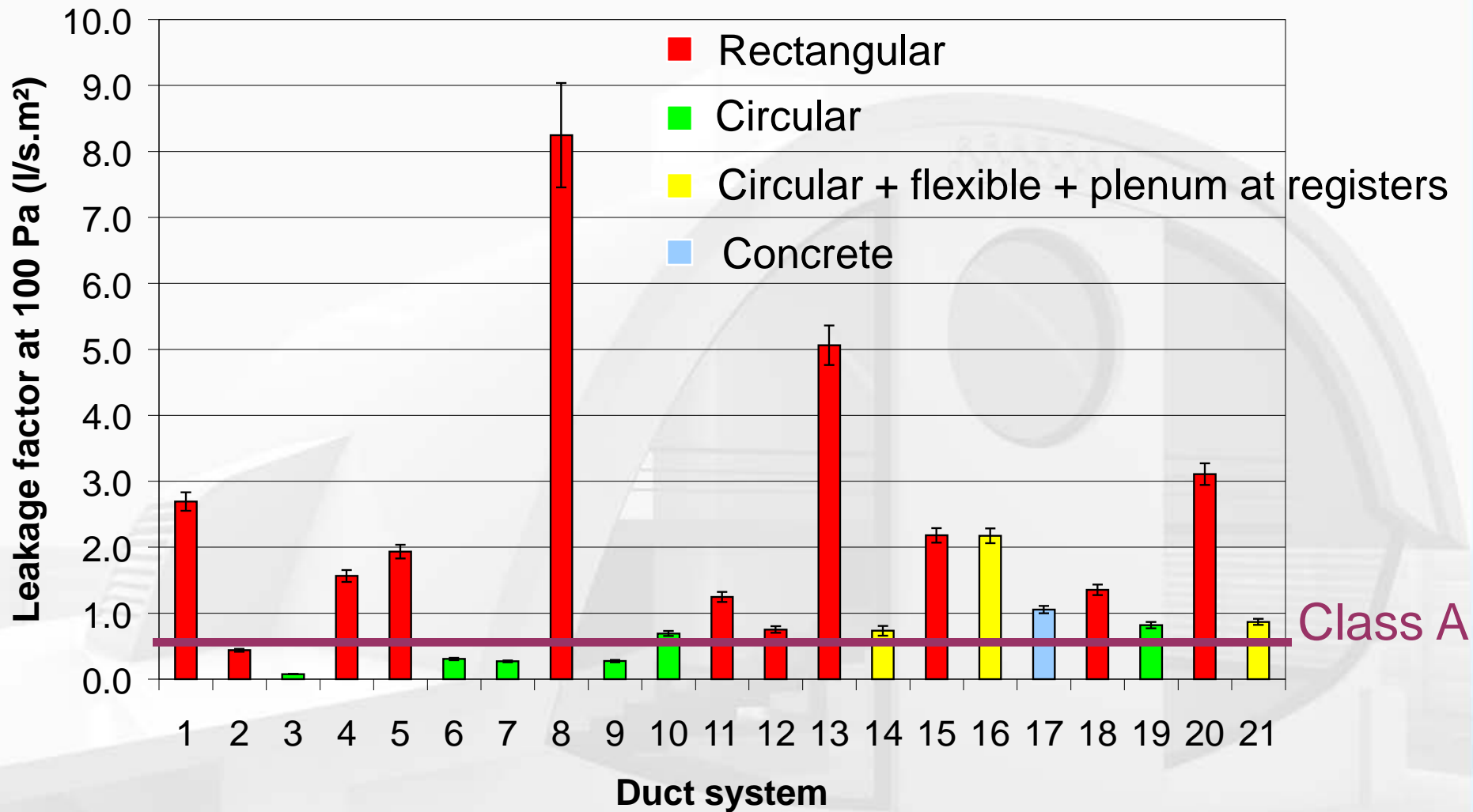
Results of the SAVE-DUCT project

- ❖ Measurement of airtightness of ductworks on site (end 90's):
 - 21 in **Belgium**
 - 21 in **France**
 - 69 in **Sweden**
(randomly selected among data from compulsory checks at commissioning)

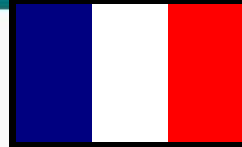




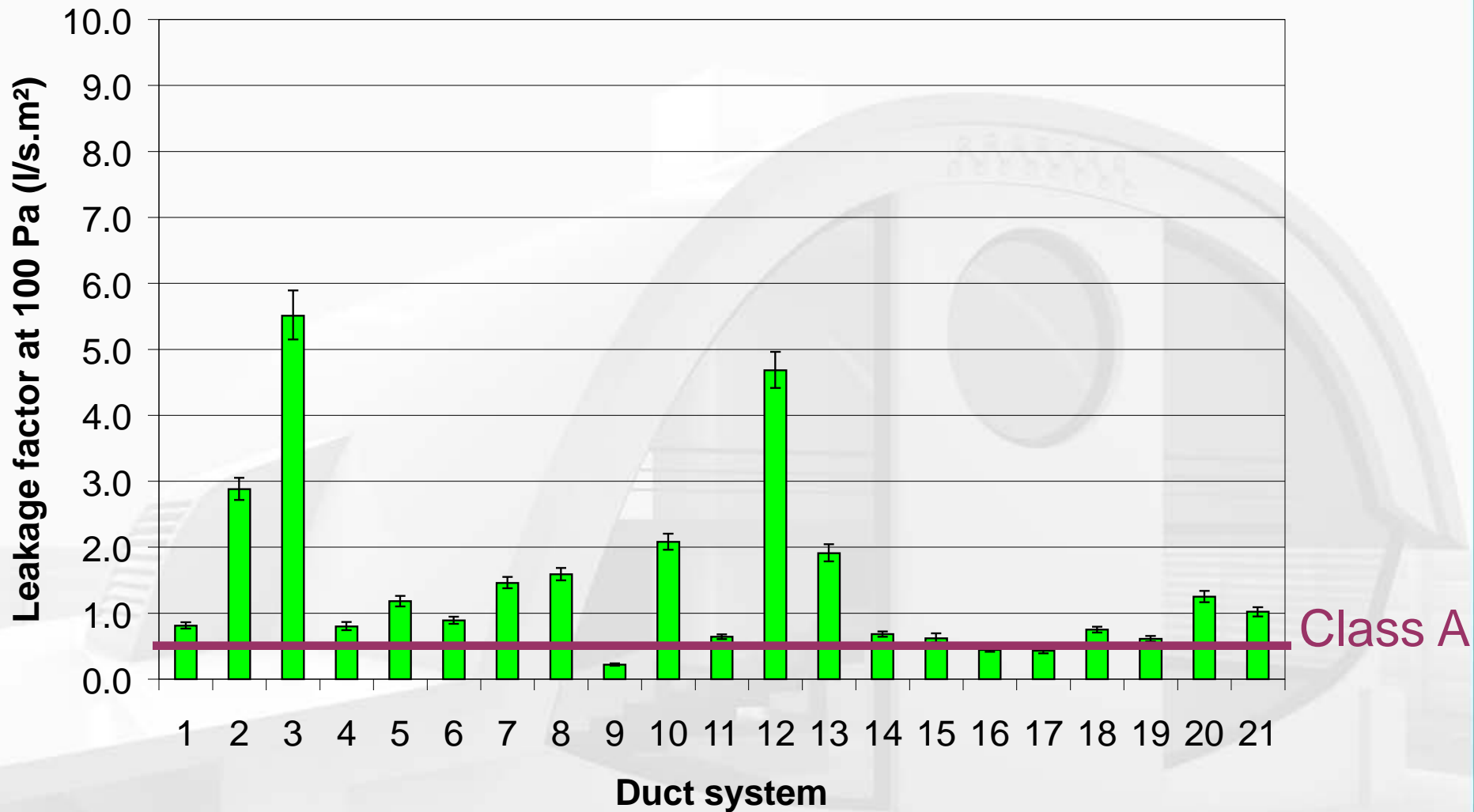
Results for Belgium



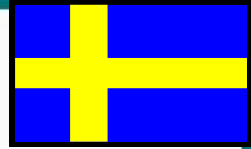
Very high leakages: almost all worse than class A (the worse class)
Circular = 7 x tighter than rectangular (in this case)



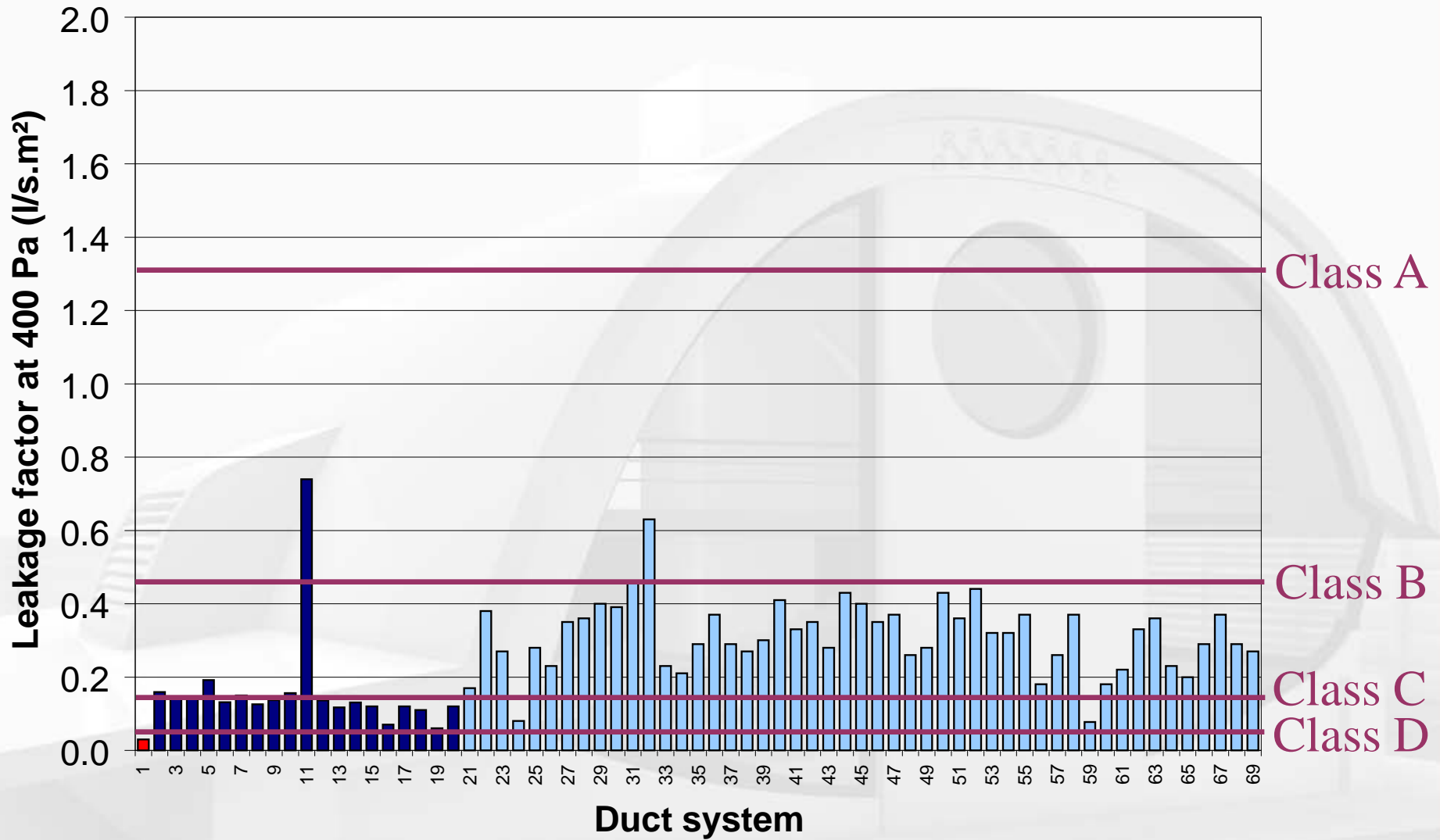
Results for France

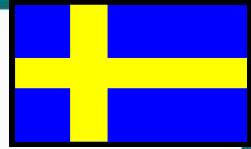


Very high leakages: almost all worse than class A (the worse class)



Results in Sweden (at 400 Pa)

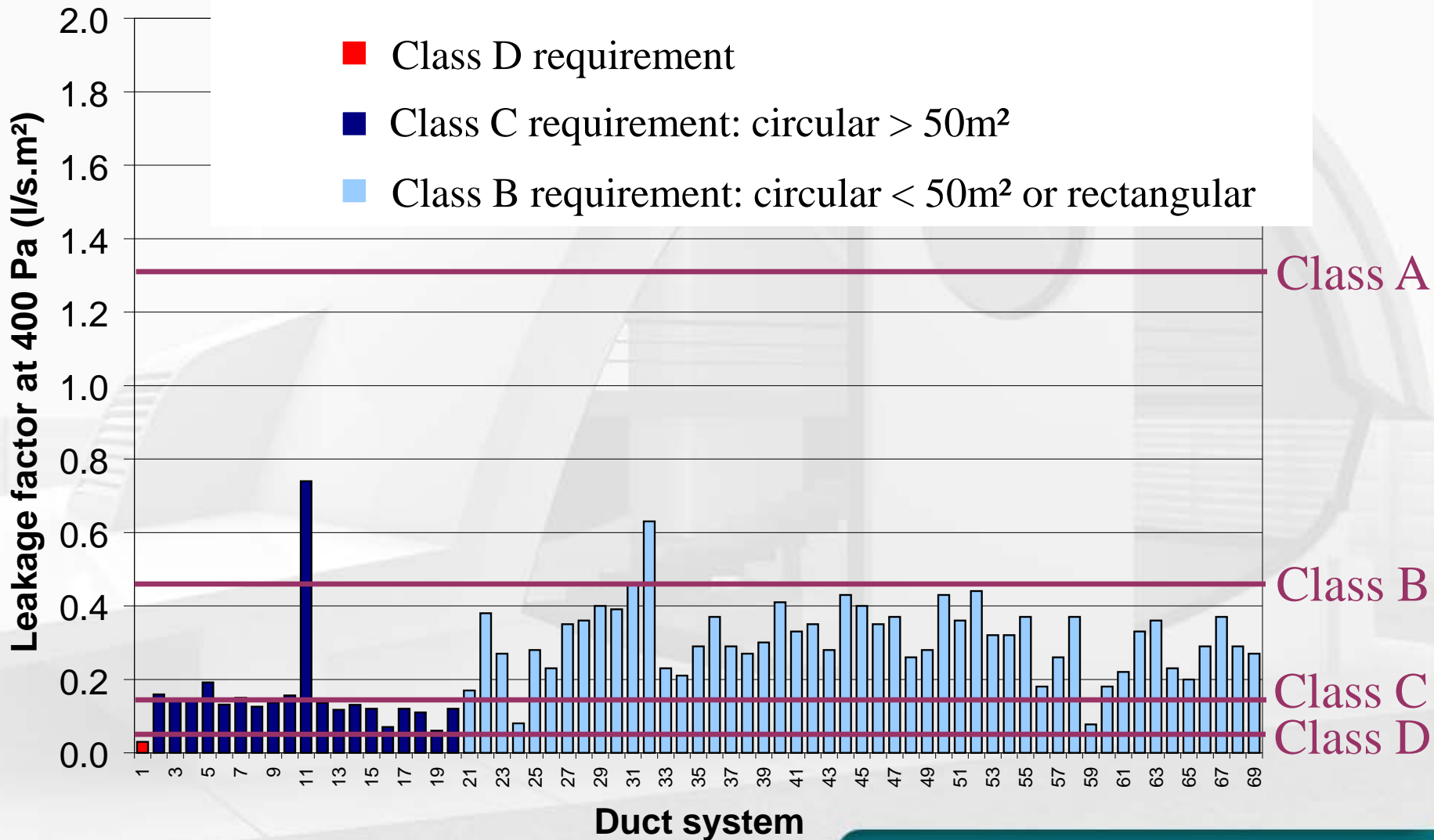


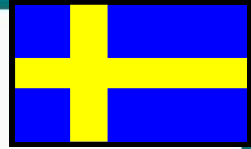


Results for Sweden (at 400 Pa)

Requirements (AMA) for ductwork airtightness in Sweden:

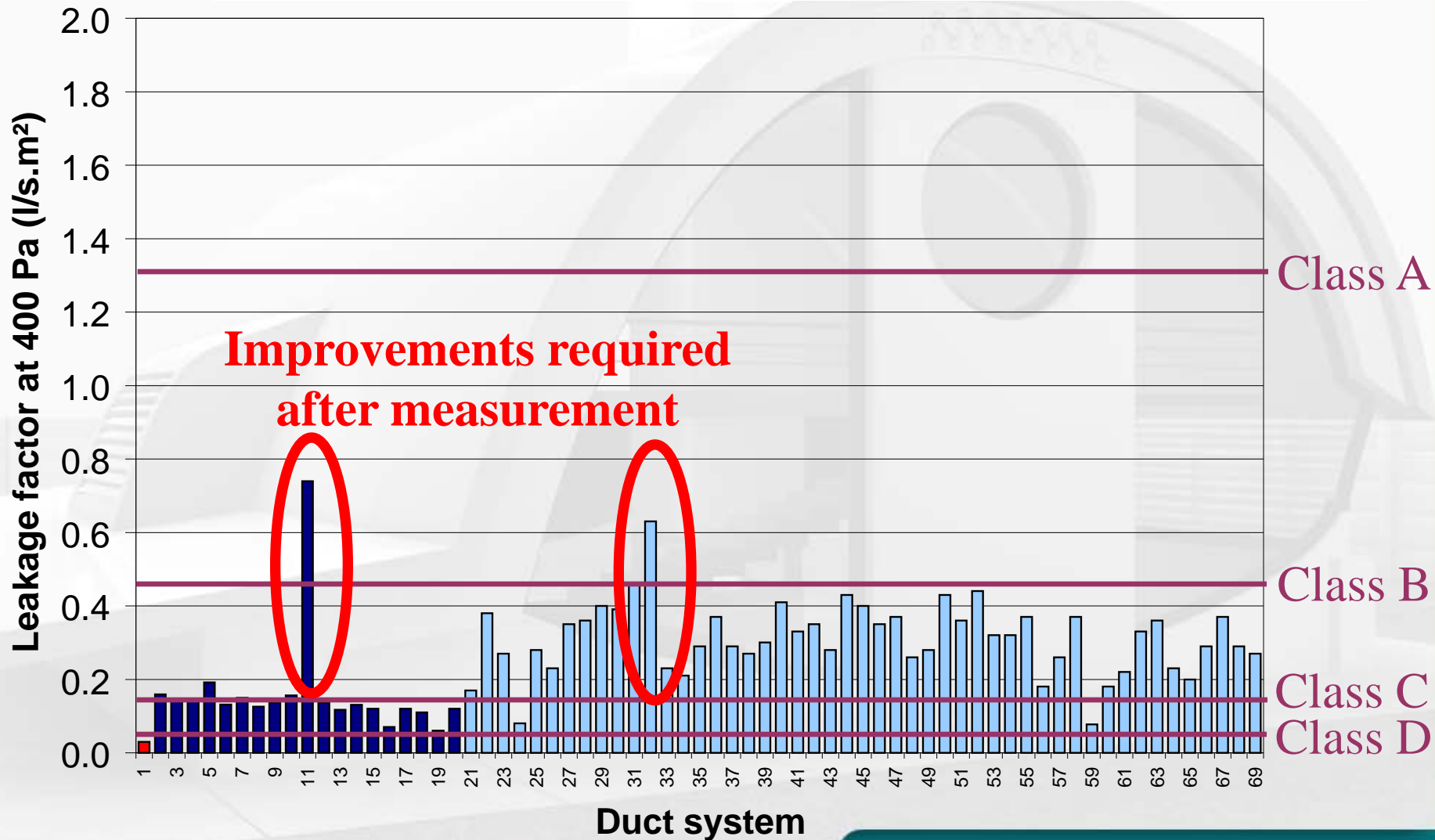
- Class D requirement
- Class C requirement: circular > 50m²
- Class B requirement: circular < 50m² or rectangular





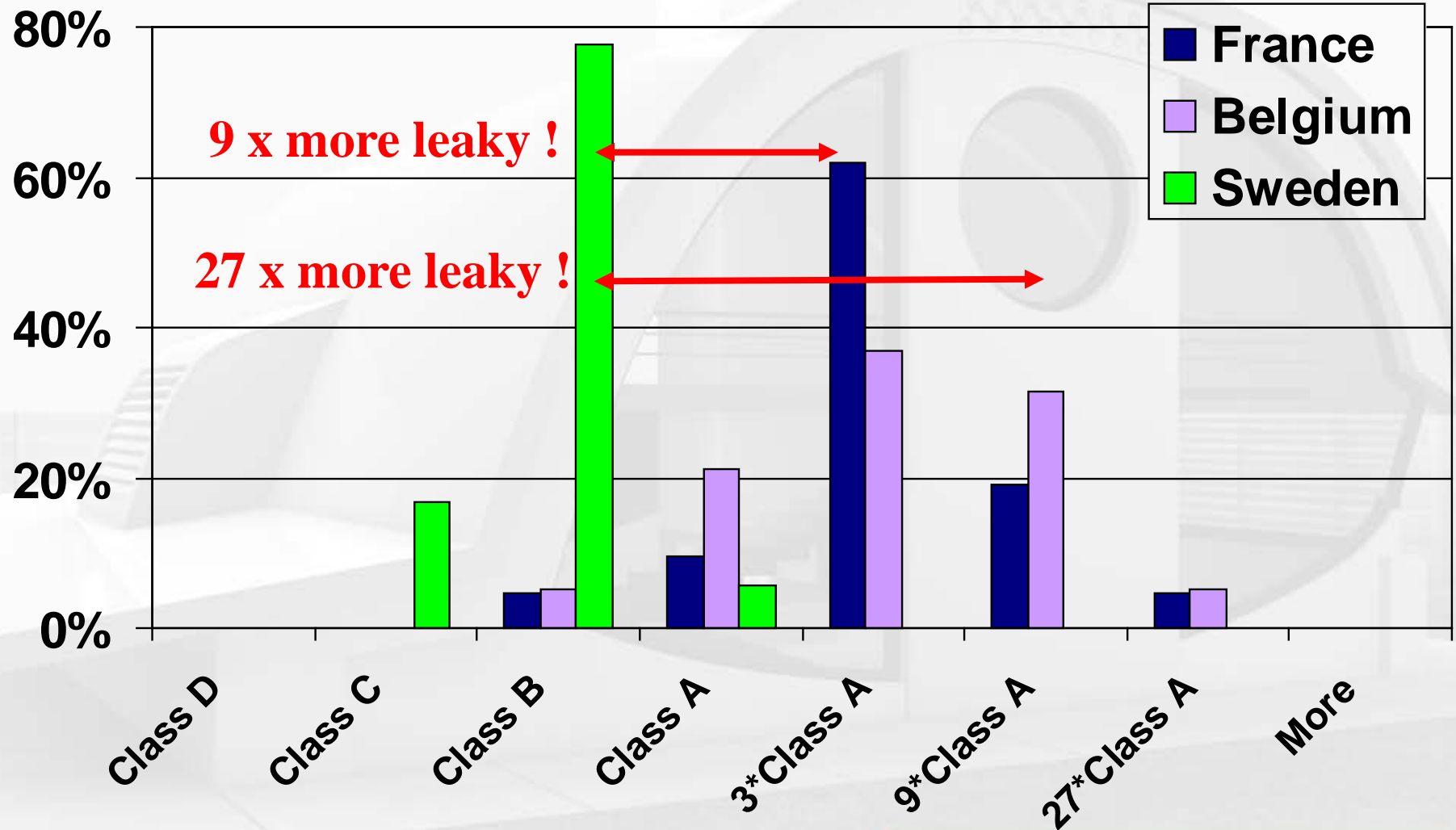
Results in Sweden (at 400 Pa)

In Sweden, compulsory airtightness check at commissioning:





Comparison countries...





Consequences: Energy and/or Indoor Air Quality...

❖ Fan flow is not adjusted to compensate leakage air flow rate



- ❖ No direct energy losses
- ❖ Bad indoor air quality

❖ Fan flow is adjusted to obtain correct air flow at terminals

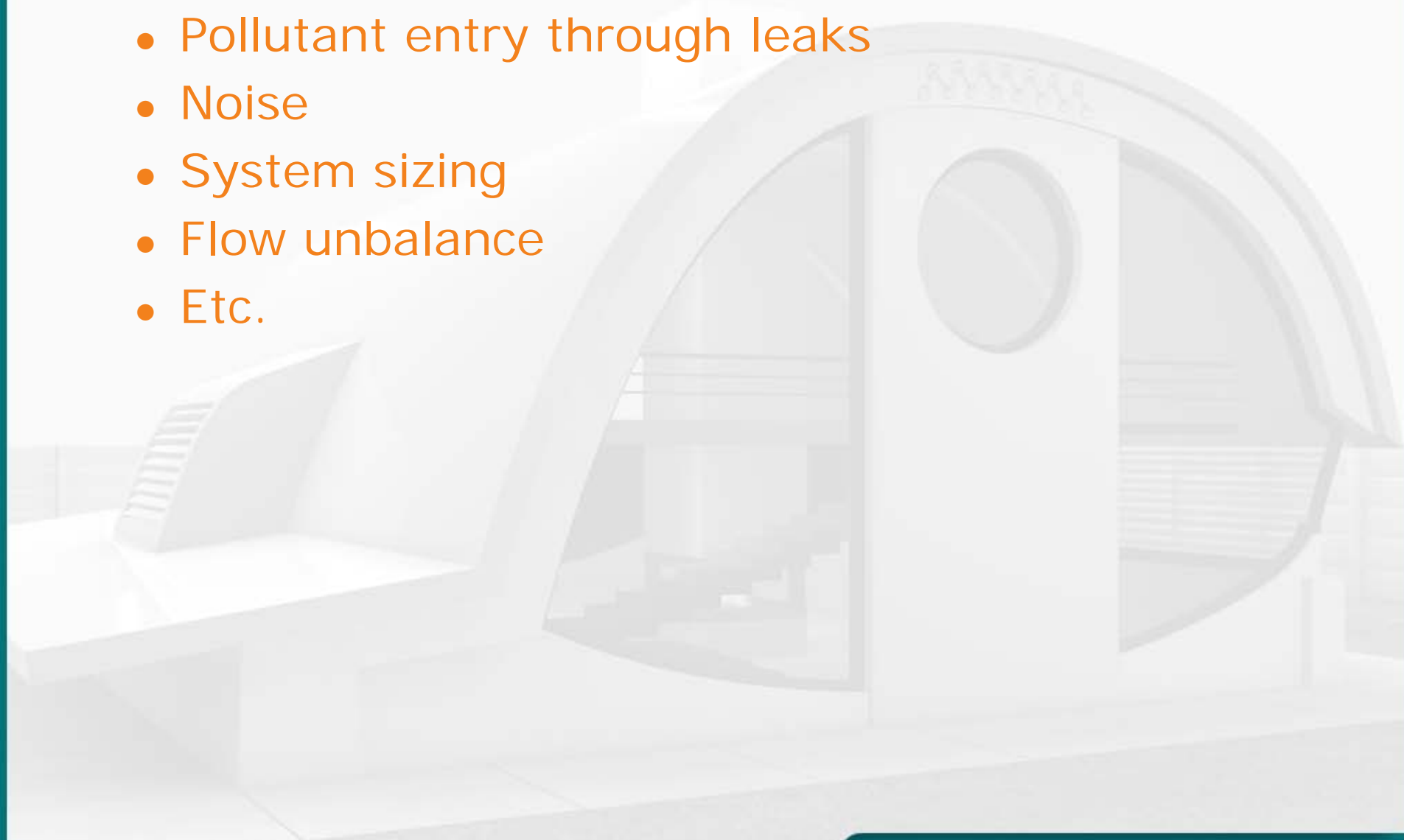


- ❖ Energy losses by:
 - increased ventilation load
 - increased fan power demand



Also other consequences of leakages

- Pollutant entry through leaks
- Noise
- System sizing
- Flow unbalance
- Etc.





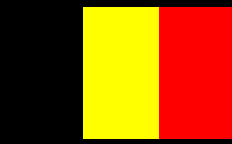
Ex. Potential IAQ problems

- ❖ Air flow supplied in the rooms vs. air flow delivered by the fan

Building	Air flow in the rooms (m³/h)	Air flow at the fan (m³/h)	Rooms/fan (%)
School 1	1100	1750	63%
Office building	1050	2350	45%
Café-Bar	1000	1500	67%
Rooms in an hotel	6500	8600	76%
Office in a school	750	1000	75%

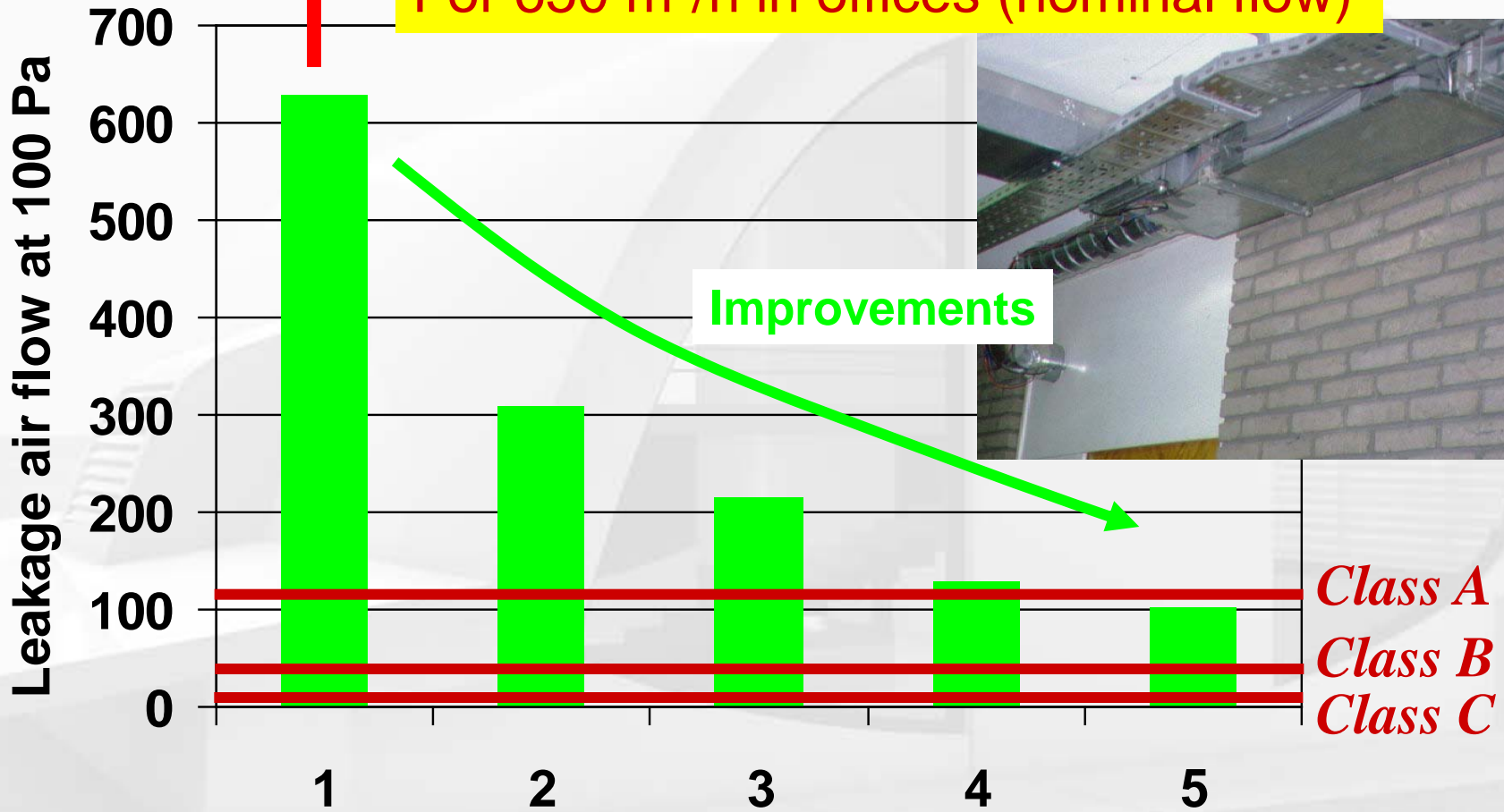
Measurements carried out in France in different types of buildings

Source: AIRWAYS project



Ex. PROBE building: **sizing + energy**

Initial: leaky rectangular ducts
1300 m³/h delivered by the fan
For 650 m³/h in offices (nominal flow)

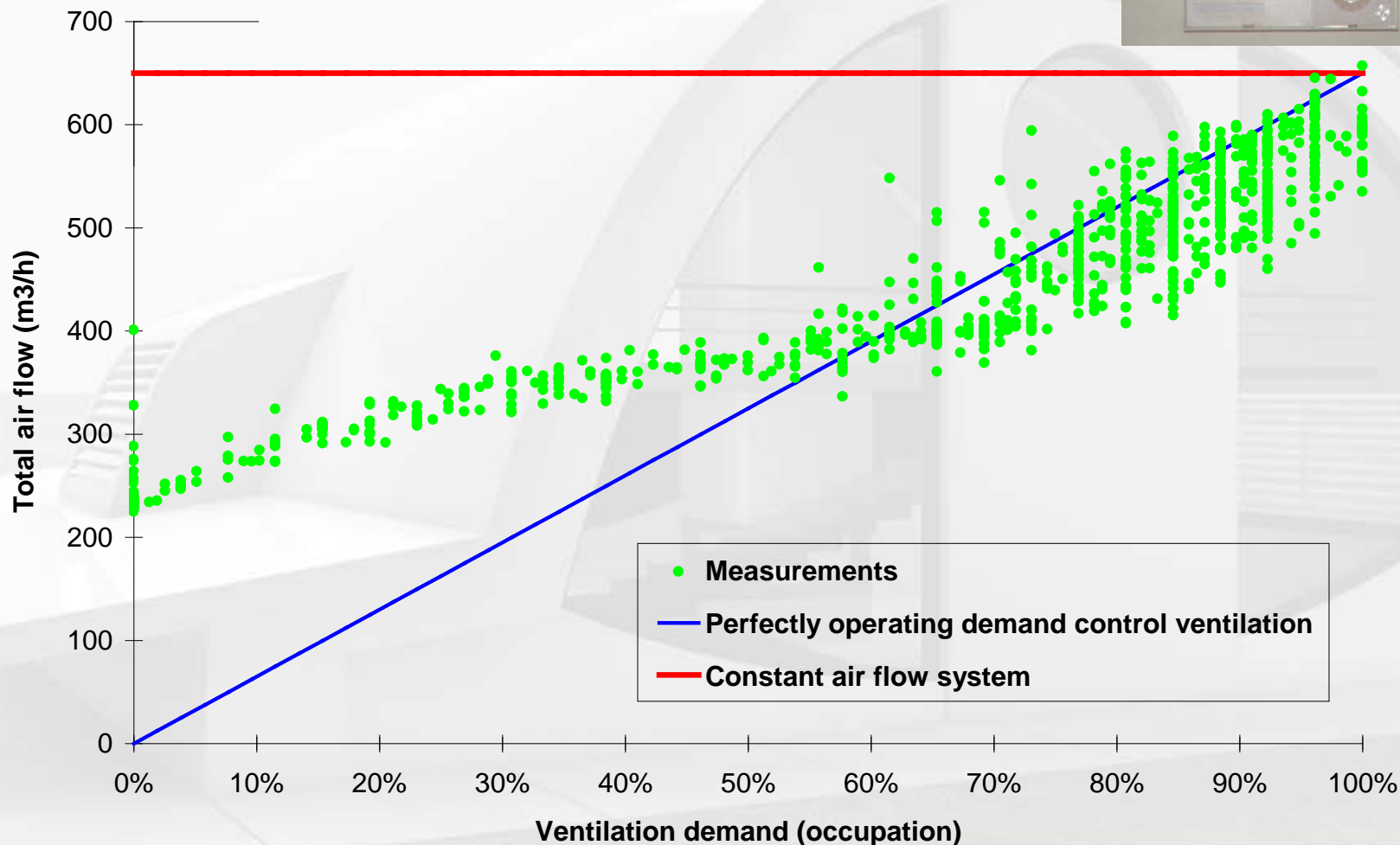


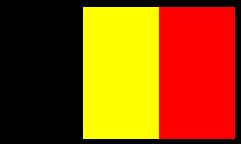
Improvements



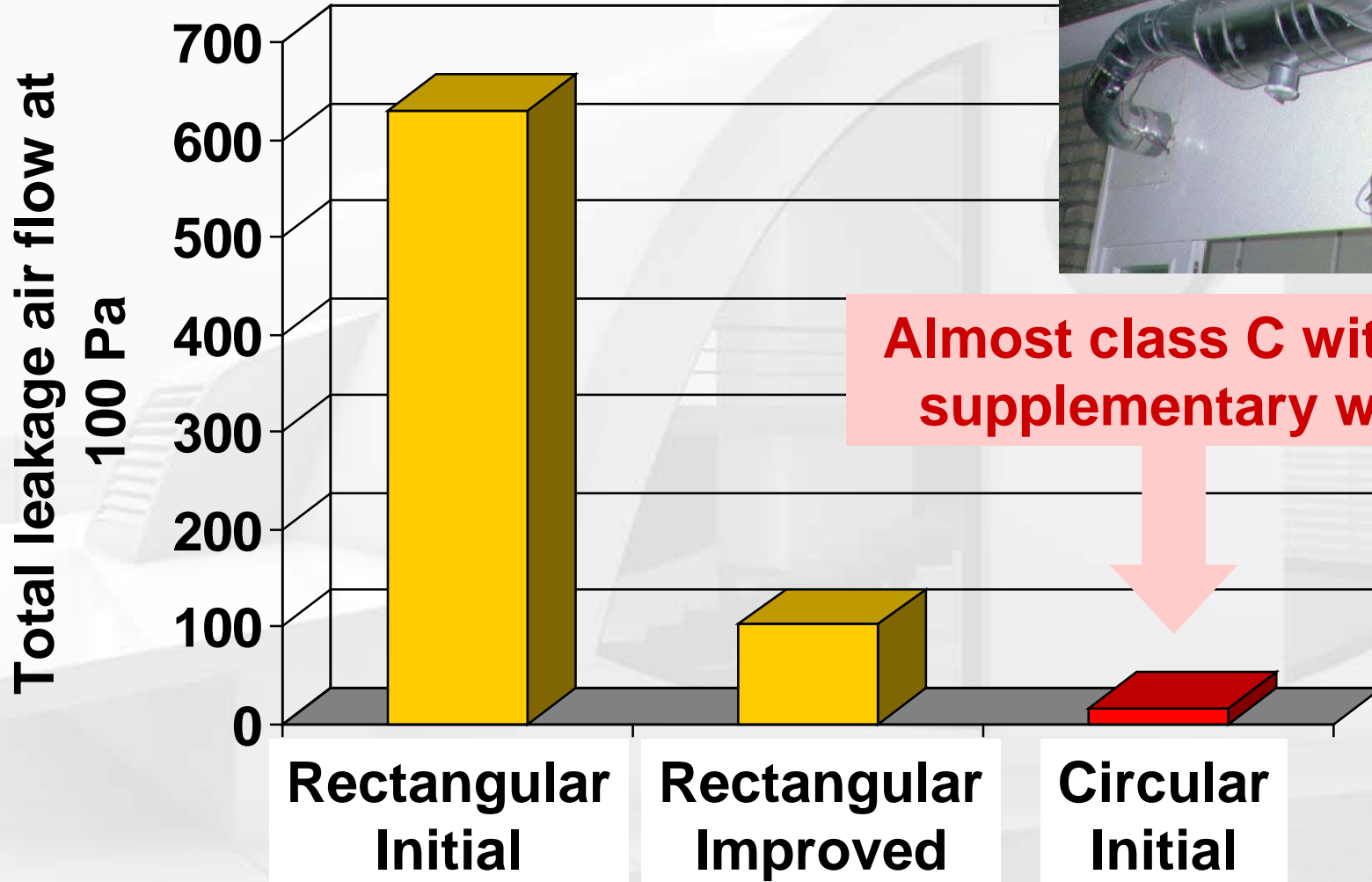
Ex. Impact on demand ventilation: energy

- Fan: constant pressure
- Air terminal devices: Presence detection + Constant flow





Solution? Example PROBE building



Almost class C without supplementary work





Conclusion: improvement is necessary!

- ❖ Effect on IAQ (lower flow rates)
- ❖ Effect on ventilation heat losses
 - About 15% in Belgium and France
 - High potential at EU level!
- ❖ Effect on fan electrical consumption
- ❖ Especially important for
 - Large ductwork surfaces
 - High operating pressure



Conclusion: improvement is possible!

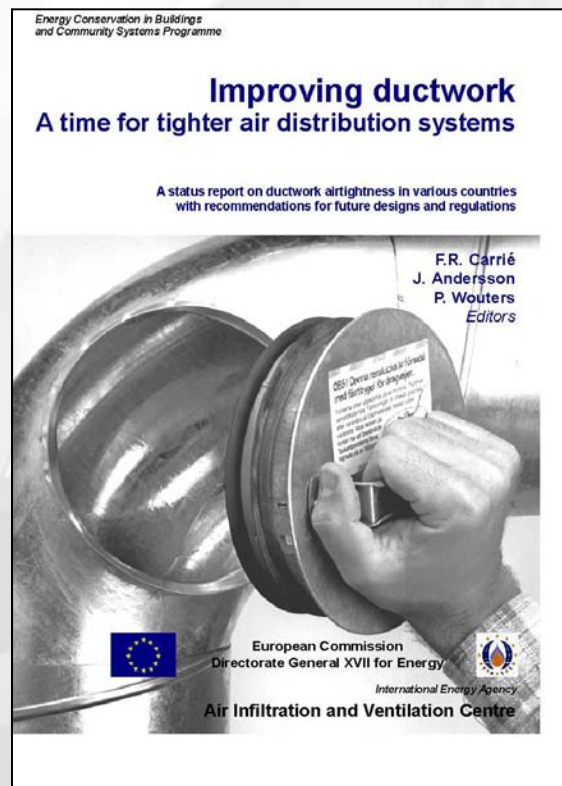
- ❖ Very bad ductwork airtightness
 - In Belgium and France (SAVE-DUCT project)
 - In other EU countries?

- ❖ Higher performance is possible
 - In Sweden
 - Without supplementary work: PROBE example

- ❖ Accessible cost:
 - Decrease of operating costs (energy)
 - Possible decrease of installation cost (less labor)



More information: SAVE-DUCT handbook



Available on www.aivc.org



Disclaimer

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