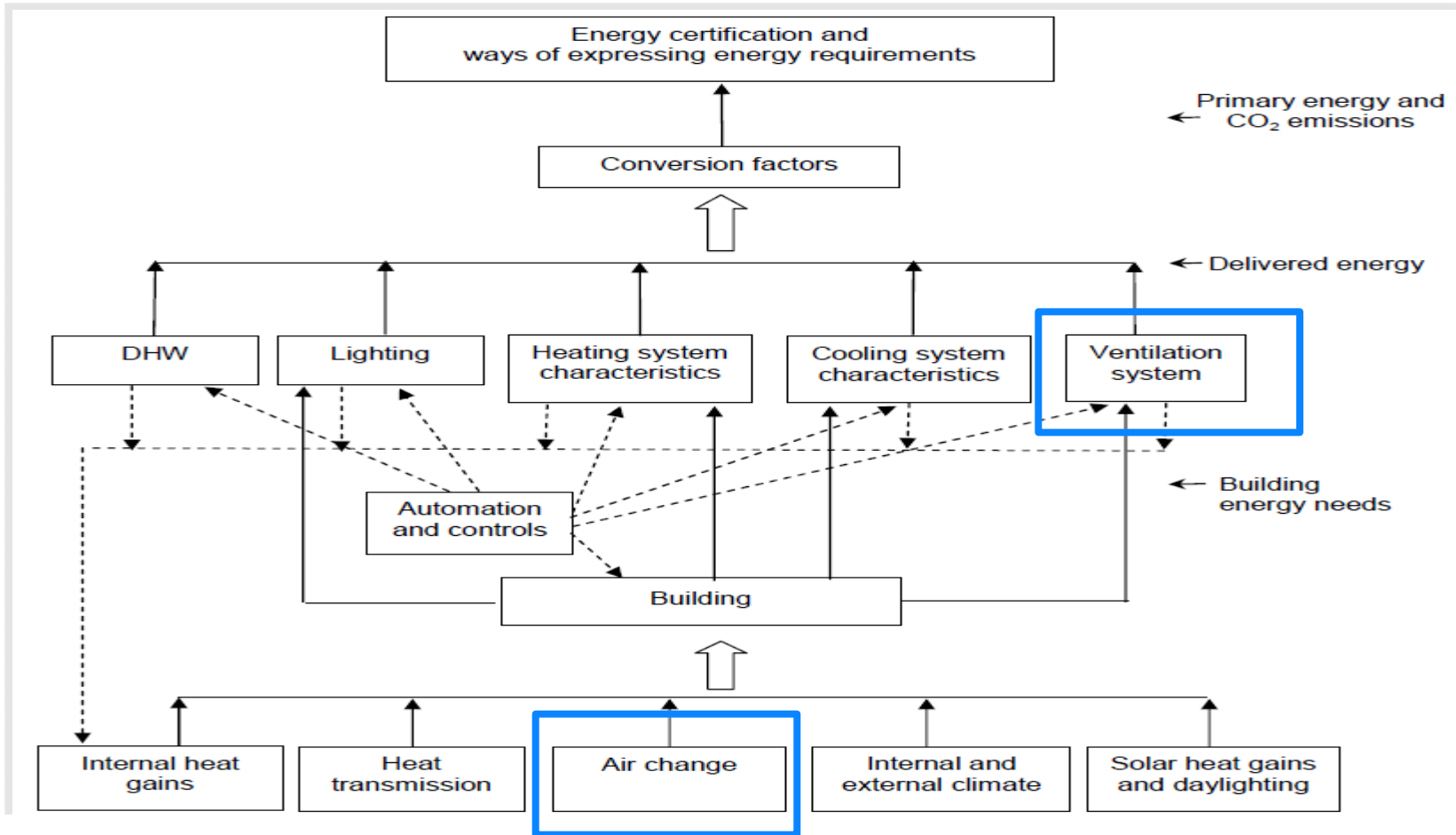


Including leakage in energy calculations



How duct airtightness works

- Duct leakages are a weak point of ventilation
- It results in unintentional flows between fan and air supply-exhaust components
- And in penalties on :
 - Indoor air quality
 - Direct and possibly indirect energy consumptions
- What are the main parameters ?
 - The air leakage / duct area
 - The duct area
 - The duct pressure difference with surrounding
 - The duct situation (indoor vs outdoor ; supply vs exhaust)

Basis of the calculation

- **qvductleak** : air through the duct leakages in dm³/s

$$q_{v\text{ductleak}} = \frac{A_{\text{duct}} K dP_{\text{duct}}^{0.65}}{1000}$$

- A_{duct} : duct area in m².
- dP_{duct} : pressure difference between duct and ambient air in Pa – unless otherwise
- K airtightness of duct in m³/(s.m²) for 1 Pa,
- **Expressed through Duct coefficient *Cductleak***
 - *Indoor part, outdoor part*
 - If some parameters are not known, a default value is given in EN15242 depending on the duct class

	K	lost/airflow	Cindoorleak
default = 2.5*class A	0.0000675	0.150	1.15
class A	0.000027	0.060	1.06
class B	0.000009	0.020	1.02
class C or better	0.000003	0.00	1.0

Impacts of duct leakages

- **Bad running of air terminal devices**
 - **Loss of pressure > airflows in habitable rooms can be reduced > impact on IAQ**
 - **Additional airflows are in general provided to - exhaust from non habitable areas > low impact on IAQ**
- **Additional air flows in heated areas**
 - **Increase heating (and possibly cooling) needs**
 - **Without control through terminal devices**
- **Loss of performances for heat recovery system**
 - **Especially due to impact of outdoor ducts**
 - **Both for supply and exhaust air**
- **Possible increase of fan electrical consumptions**
 - **As the airflow to be provided is higher**

Relationship with EPBD standards

- Duct leakages and areas
 - Calculation of K (EN 12337 :circular ducts), prEN 1507 :rectangular ducts) and Area values (EN 14239).
- Ventilation calculation(EN15242)
 - Calculation of airflows in the ventilation system and provided and/or extract flows to the building together with infiltration calculation.
- Energy impact for the ventilation system (EN15241)
 - Calculation of temperatures and humidity of provided air
 - Calculation of energy needs for air treatment (thermal and transportation)
- Energy needs for heating and cooling EN 13790
 - Air flows, temperature humidity's are input data's from 15241 and15242

Disclaimer

- The ASIEPI project (www.asiepi.eu) has received funding from the Community's Intelligent Energy Europe programme under the contract EIE/07/169/SI2.466278.
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