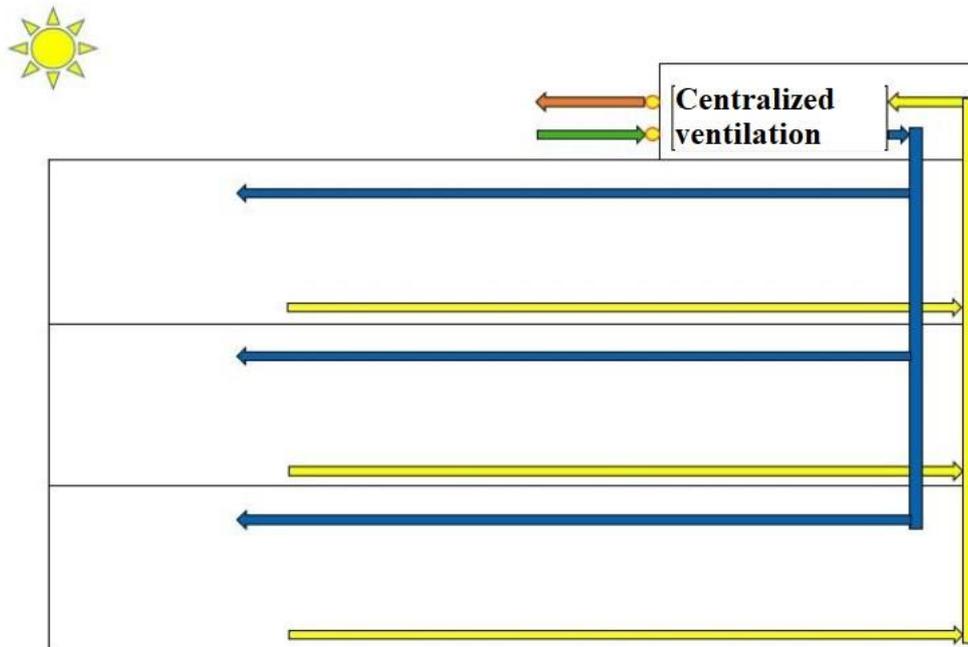


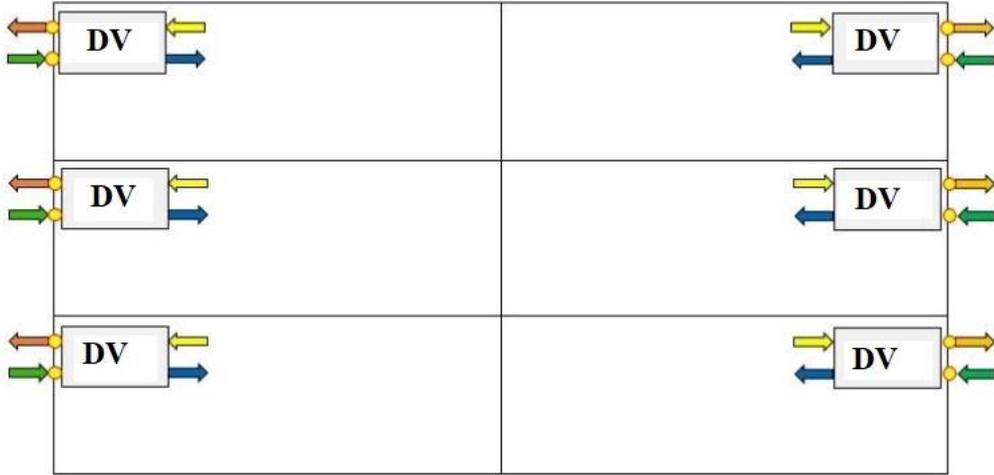


Centralized vs. decentralized ventilation

Case 1

Centralized ventilation systems use a ductwork to transport the supply and extract air, while decentralized systems, each device equipped with a heat exchanger and fans, are usually placed directly in the facade of the building.





In the following tables I have summarized the pros and cons of centralized and decentralized ventilation systems respectively.

Centralized ventilation

PROS

1	It requires few penetrations for air intake and removal (i).
2	They are easy to control from one central thermostat (i).
3	Comfortable, consistent temperature from room to room (v).
4	Noise pollution is often lower with centralized systems, because with a centralized fan it is possible to buffer the sound so that noise from the fan will not be heard in living areas (vi).
5	Maintenance cost are usually lower than in decentralized solutions because of the fewer units to service (i).

CONS

1	Usually takes up more space than the decentralized ventilation systems, because it requires the installation of a ductwork to transport the supply and extract of air. It also requires space for a large mechanical room (i).
2	It normally requires the installation of new fire and smoke dampers (i).
3	It isn't possible to make a stepwise replacement of the old ventilation system. Therefore, there will probably be more costs for rehousing the users, while the renovations take place (i).
4	Higher energy consumption compared to decentralized ventilation (ii, iii).

Decentralized ventilation

PROS

1	Usually takes up less space than the central ventilation systems. It has multiple, small mechanical rooms (i).
2	It normally won't require additional fire protection costs(i).
3	It is possible to make a stepwise replacement of the old ventilation systems, and by that the remaining rooms continue to be available for the users. This can reduce the cost of rehousing (i).
4	Despite of the lower efficiencies of smaller fans compared to bigger ones, the missing ductwork leads to lower pressure losses for decentralized devices and thus, to a lower power consumption (ii, iii).
5	Allows for easier individual control of separate spaces (v).

CONS

1	It requires many penetrations for air intake and removal (i).
2	Maintenance can be more expensive because of the many units, although there are examples of cloud solutions, where it is possible to control all the decentralized units online from one location (i).
3	Decentralized systems produce higher noise levels (ii).

Installation costs

Regarding the installation cost, there is no clear answer to whether centralized or decentralized systems are to prefer. Some authors (iv) have found that initial cost could be 27% higher for decentralized systems, while others have come to the opposite conclusion, and consider decentralized ventilation to have lower installation costs than centralized solutions, as it is possible to avoid running new ductwork throughout the building (vii). However, the installation costs depend to a large degree on whether the ventilation systems are installed in older buildings or as part of a newbuilding. In the former case, it can generally be less expensive to use a decentralized approach to ventilation (vi).

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