Cooling Strategies for Buildings in Vietnam

dena project: “Vietnam – Building Transition” 2021 - 2022

German Energy Agency

Primarily Uncooled Building (PUB)

Buildings either without, or with air-conditioning, mainly operated in particularly warm conditions. The main aim is to increase the amount of comfortable hours without air-conditioning.

Primarily Cooled Building (PCB)

Buildings where air-conditioning is always operating. The main aim is to minimize the heat flow into the building during the day.

Specific strategies for each building type

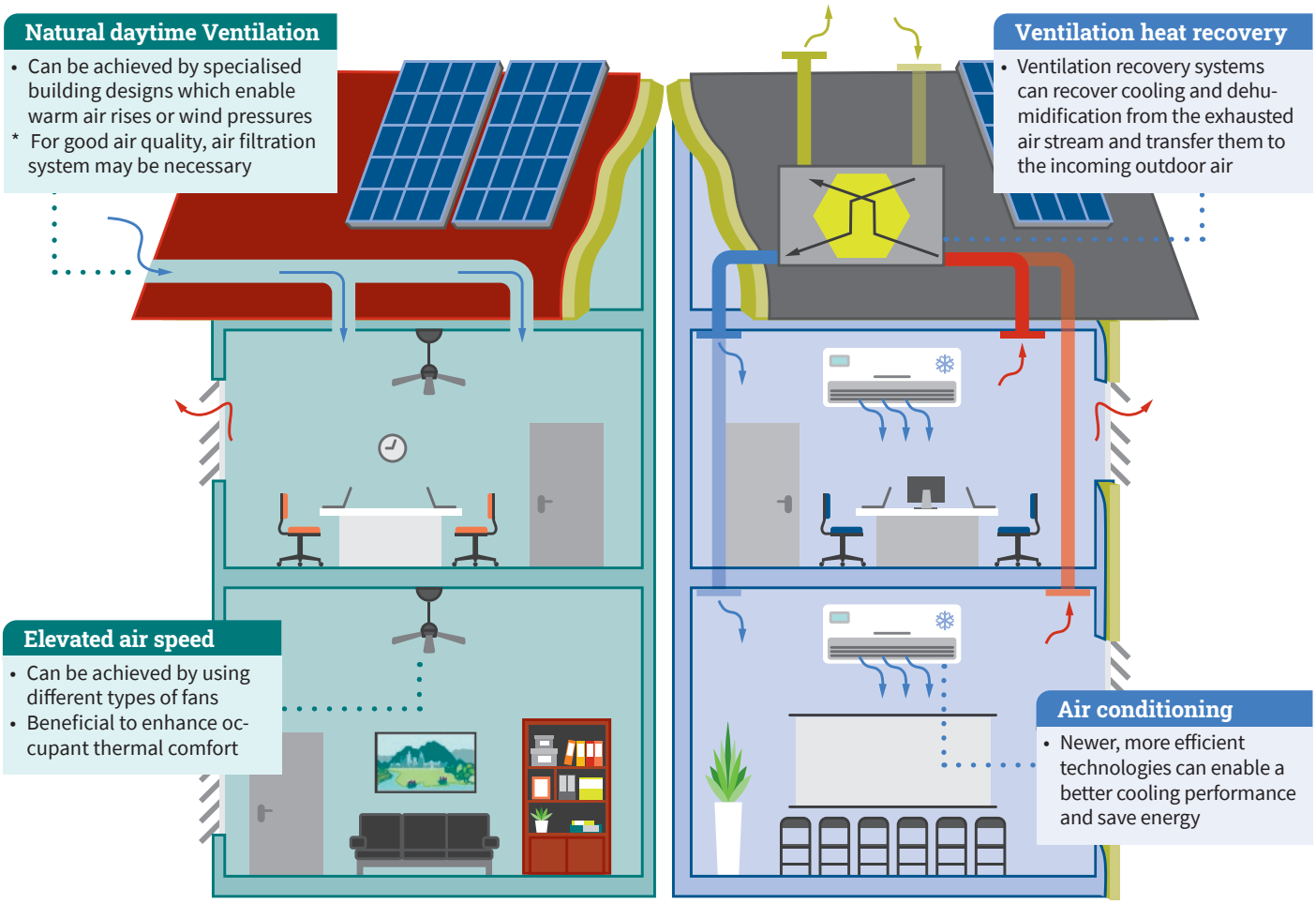
Natural daytime Ventilation

- Can be achieved by specialised building designs which enable warm air rises or wind pressures

* For good air quality, air filtration system may be necessary

Ventilation heat recovery

- Ventilation recovery systems can recover cooling and dehumidification from the exhausted air stream and transfer them to the incoming outdoor air



Elevated air speed

- Can be achieved by using different types of fans
- Beneficial to enhance occupant thermal comfort

Air conditioning

- Newer, more efficient technologies can enable a better cooling performance and save energy

Strategies for both building types

Construction weight

- Heavy construction materials (e.g., masonry or concrete) could retain coolness throughout the day and resist rapid temperature increases

Glazing

- Single glazed windows help the building release the heat built up during the day
- Smaller window to wall ratio reduces the amount of solar heat gain
- Use of tint or low-e coating for glazing is beneficial for PCB

Roof insulation

- Small amounts of roof insulation can improve the cooling performance

Shading

- Minimises the heat from solar radiation

Night-time ventilation

- Removes the heat built up during the day and stores cooler night air temperature in the thermal mass
- Mechanical ventilation allows higher air change rates

For **uncooled buildings**, effective shading shows the strongest cooling effect and mechanical night ventilation the second strongest. Optimal construction and glazing also show a noticeable cooling impact.

For **cooled buildings**, effective shading and smaller window to wall ratio have the most prominent cooling effects. Glazing performance also shows a significant cooling impact.