Demand controlled ventilation (DCV) helps to maintain good indoor air quality while optimizing energy consumption. In a typical setup only indoor CO₂ levels are measured. Ventilation controls are operated based on the assumed outdoor CO₂ level of 400 ppm. However, locally elevated CO₂ levels occur due to CO₂ emissions from transportation, energy production and industrial manufacturing.

Ventilation guidelines, such as ASHRAE, recommend indoor CO₂ levels not to exceed the surrounding outdoor concentration by 700 ppm. Also, LEED guidelines suggest providing an alarm when the indoor CO₂ level exceeds the outdoor level by 530 ppm, or 1,000 ppm absolute. Reliable correlation between indoor and outdoor CO₂ levels can only be achieved by measuring both.

Measuring CO₂ Outdoors

Knowing outdoor CO₂ levels helps when assessing indoor conditions. During periods when the outdoor CO₂ level exceeds 412 ppm the space may be over-ventilated. In order to truly optimize energy consumption, outdoor CO₂ concentration should be measured. The real-time differential between indoor and outdoor CO₂ concentration can be used as a control parameter.

As there are large diurnal and seasonal variations in outdoor temperature, the outdoor CO₂ instrument should automatically compensate for temperature variations.
Outdoor CO₂ sensors need to operate in varying conditions. They have to tolerate rain, hail, snow, solar radiation, dirt and dust, as well as temperature extremes between -40 and +60 °C (-40 ... +140 °F).

GMP252 inside the DTR250 radiation shield is an ideal solution for dynamically measuring outdoor CO₂ levels. This combination meets the specifications of Section 6.2.7 of ASHRAE Ventilation Standard 62.1.

Vaisala Radiation Shield DTR250 Series:
- Naturally ventilated, maintenance-free shield protects the probe from both scattered and direct solar radiation, and precipitation
- Two options: DTR250 for direct mount to existing support bars and DTR250A for mounting to a pole, mast, or vertical surface.

GMP252 probe features:
- Wide operating temperature range of -40 ... +60 °C (-40 ... +140 °F)
- Integrated temperature sensor for continuous compensation
- Sensor head heated to prevent condensation
- Traceable calibration (certificate included)
- Possibility to compensate for pressure (site elevation)

In addition to outdoor CO₂ measurement Vaisala offers complimentary instruments for outdoor relative humidity and temperature measurements that also use integrated solar radiation and precipitation shield

Vaisala HMS110 Series HUMICAP Humidity and Temperature Transmitters
- Measurement range of 0 to 100% RH & -40 to +60°C (-40 to +140°F)
- Traceable calibration certificate included
- 2 Loop powered, 4...20mA analog outputs
- Modbus RTU digital output
- Selectable humidity parameter outputs (dewpoint, enthalpy, etc.)
- Service port for on-site calibration, adjustment, and setting changes
- Integrated radiation shield for solar and precipitation protection
- Mounts directly onto a wall or pole without any extra accessories.