WEST DUNBARTONSHIRE COUNCIL

Report by Chief Education Officer: Laura Mason

Council: 22 December 2021

Subject: Ventilation in Learning Establishments - Motion from Council 27 October 2021

1. Purpose

1.1 This report provides an update for member on the approaches taken to ensure adequate ventilation across our learning estate.

2. Recommendations

2.1 Members are asked to:

a. Note the types of ventilation systems across our learning estate;
b. Note the processes in place for monitoring levels of CO_2 present in learning and teaching spaces across the learning estate and with our partner providers; and.
c. Note that processes in place to escalate any area of concern and steps taken to improve ventilation.

3. Background

3.1 It is important to have good air quality in the places where we work and where our children learn. People exhale carbon dioxide (CO_2) when they breathe out. If there is a build-up of CO_2 in an area it can indicate that ventilation needs improving. CO_2 is measured in 'parts per million' (ppm) present in the air. Although CO_2 levels are not a direct measure of possible exposure to COVID-19, checking levels using a monitor can help identify poorly ventilated areas. CO_2 measurements should be used as a broad guide to ventilation within a space rather than treating them as 'safe thresholds'.

3.2 Outdoor levels of CO_2 are around 400ppm and indoors a consistent CO_2 value less than 800ppm is likely to indicate that a space is well ventilated, as defined by the Health and Safety Executive (HSE).

3.3 Levels of CO_2 that are consistently higher than 1,500ppm over the occupied period in a space is an indicator of poor ventilation. Action needs to be taken to improve ventilation where CO_2 readings are consistently higher than 1,500ppm.

3.4 However, where there is continuous talking or singing, or high levels of physical activity (such as dancing, playing sport or exercising), providing ventilation sufficient to keep CO_2 levels below 800ppm is recommended.

3.5 Across the learning estate there are a variety of approaches to ventilation spread across two types of 'natural' and 'mechanical' ventilation systems. Natural ventilation systems involve the use of opening windows, doors and trickle vents to improve air flow. Mechanical ventilation systems involve extractors, air conditioning and air handling units to improve air flow without the need of manual intervention. A list of our establishments and the types of ventilation systems they have is provided in **Appendix 1**.

4. Main Issues

4.1 Session 2020/21 was subject to considerable disruption, with schools having periods of time when they were not occupied. As such, there was no additional cost for heating required. During times when schools were open, rooms were being ventilated and heated at the same time, without the ability to measure the effectiveness of the ventilation or the impact on the heating. With monitors in place for the heating season of 2021/22, it will be possible to accurately measure the impact of our approaches to heating and ventilating.

4.2 Towards the end of the session 2020/21, WDC started a process of measuring levels of CO_2 present in teaching and learning spaces across the learning estate. This activity ran until November 2021, giving baseline readings across all of our establishments. This process began prior to updated guidance from HSE, where we regarded readings of between 400 – 1,000ppm as acceptable.

4.3 Our baseline readings showed that all of our learning and teaching spaces fell within an acceptable range of 400 – 1,000ppm levels of CO_2 concentration. Some initial readings taken were higher than 1,500ppm, but immediate steps to improve the ventilation in those spaces resulted in levels falling to within acceptable levels. In two locations, alterations were made to windows to ensure adequate means of adjusting ventilation were in place. In Levenvale, repairs were made to existing windows to facilitate their opening, and in St. Peter the Apostle High School, windows were replaced in the music department, costing £42,114.

4.4 In August 2021, a working group was established to coordinate activity across Environmental Health, Health & Safety, Education, Asset Management, Energy & Compliance, IT, Procurement and Corporate Administration Services following the announcement by Scottish Government of additional funding to monitor levels of CO_2 in our learning and teaching spaces. Scottish

Government asked us to report on progress with monitoring levels of CO_2 across our learning estate. The group worked to establish a process for regular readings to be taken across all learning and teaching spaces, and to establish a process for the escalation of any readings taken that were considered to be too high. The group met on a weekly basis, identifying suppliers of CO_2 monitoring devices and a route to procurement. With the large number of learning and teaching spaces across the learning estate, distribution and logistics were also considered and agreed.

4.5 An audit of the number of learning and teaching spaces and locations where staff and young people spend time together in our establishments and those of our partner providers identified a requirement for 1,560 CO_2 monitors. Funding also made it possible for staffing time to collect and administer the data and report on levels recorded.

4.6 In September 2021, the membership of the working group was widened to include Trade Union representatives, to ensure an agreed approach to monitoring and reporting levels of CO_2 present in learning and teaching spaces. The agreed process document is included as **Appendix 2**.

4.7 Approximately half of our purchased monitors have been distributed to establishments, and are now in use. The remaining devices are expected from our supplier during December 2021.

4.8 CO_2 monitors give live readings, so staff can take immediate steps to increase or reduce ventilation as required. Where steps to reduce levels of CO_2 are insufficient, discussion with the Head Teacher, Head of Centre or Responsible Premises Officer (RPO) can ensure other means of reducing levels of CO_2 in a learning and teaching space have been actioned – for example, the Head Teacher can vary the number of people making use of a space at any one time, or indeed the amount of time in each day a space is used.

4.9 Although our baseline measurements did not indicate this was required, our agreed process caters for situations where ventilation has not been brought to within acceptable levels by action taken. Should such a case occur, then a case conference will be called within 24 hours by Health & Safety, involving Asset Management, Environmental Health, Energy & Compliance and Education to ascertain what steps can be taken to improve ventilation. The outcome of any such case conference will be reported to the Joint Health & Safety Committee.

4.10 Staff submit readings using an online form. These readings are analysed by Energy and Compliance and Education, and reported to the individual establishments Health and Safety Committee and the Joint Health and Safety Committee.

5. Options Appraisal

5.1 There is no requirement to carry out an options appraisal.

6. People Implications

6.1 A resource of 0.4FTE administration staffing has been appointed to administer data collected and to assist with reporting. The provision of monitors allows staff to make informed decisions about the level of ventilation required in a learning and teaching space at any given time.

7. Financial and Procurement Implications

7.1 Financial - The sum of £121,500 capital and £53,000 revenue was received from Scottish Government. £121,500 has been spent on CO_2 monitoring devices, with £53,000 being spent on staffing costs to monitor levels of CO_2, administer gathered data and distribution of devices.

7.2 Procurement - With the timescale for taking readings and reporting to Scottish Government falling outwith the timeframe for undertaking a procurement exercise to purchase monitoring devices, the powers of the Chief Executive established in the standing orders were called upon, as reported to council in September 2021.

8. Risk Analysis

8.1 Failure to ensure adequate ventilation of learning and teaching spaces would make for inadequate working and learning environments for our staff and children. Failure to report coverage of measuring levels of CO_2 across our learning estate to Scottish Government would cause reputational damage.

9. Equalities Impact Assessment (EIA)

9.1 An equalities screening has been carried out for this report and there are no equalities issues identified.

10. Consultation

10.1 Legal Services and the Section 95 Officer have been consulted in relation to the content of this report

11. Strategic Assessment

11.1 The provision of adequate ventilation in learning and teaching spaces ensures healthy working and learning environments for our staff and children, assisting us in delivering the strategic priority of efficient and effective frontline services that improve the everyday lives of residents.

Laura Mason
Chief Education Officer
16 November 2021

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Appendices:	Appendix 1 – Types of ventilation by establishment Appendix 2 – CO_2 monitoring process
Background Papers:	EIA Screening
Wards Affected:	All wards

APPENDIX 1 – Types of ventilation by establishment

Establishment	Type of Ventilation		
	Mechanical: Extractors	Mechanical: Air Conditioning Unit	Mechanical: Air Handling Unit
Andrew B Cameron ELCC	✓		
Auchnacraig ELCC	✓		
Balloch Campus	✓		✓
Bellsmyre Campus	✓		✓
Bonhill			✓
Braehead	✓		
Brucehill ELCC	✓		
Carleith	✓		
Choices	✓		✓
Christie Park	✓		
Clydebank ELCC	✓		
Clydebank High School	✓	✓	✓
Clydemuir	✓		
Dalreoch	✓		
Dalmonach ELCC	✓		
Dalmuir ELCC	✓		
Dumbarton Academy	✓	✓	✓
Edinbarnet	✓		
Ferryfield ELCC	✓		
Gartocharn	✓		
Gavinburn	✓		
Goldenhill			✓
Kilbowie ELCC	✓		
Kilbowie	✓		✓
Kilpatrick	✓		✓
Knoxland	✓		
Ladyton ELCC	✓		
Lennox (Faifley) ELCC	✓		
Lennox	✓		
Levenvale	✓		
Linnvale	✓		
Our Holy Redeemer	✓		
Our Lady & St. Patrick's HS	✓	✓	✓
Our Lady of Loretto	✓		
Renton Campus	✓		✓
St. Eunan's	✓	✓	✓
St. Joseph's	✓		
St. Martin's	✓		
St. Mary's (Alexandria)	✓		
St. Mary's (Duntocher)			✓
St. Michael's	✓		✓

St. Patrick's	✓		
St. Peter the Apostle HS	✓	✓	✓
St. Ronan's	✓		
St. Stephen's	✓		
Whitecrook	✓		
Vale of Leven Academy	✓	✓	✓

CO_2 Monitoring Process

This document outlines the process for monitoring levels of CO_2 across the learning estate.

Why are we monitoring levels of CO_2?

It is important to have good air quality in the places where we work and where our children learn. People exhale carbon dioxide (CO_2) when they breathe out. If there is a build-up of CO_2 in an area it can indicate that ventilation needs improving. Although CO_2 levels are not a direct measure of possible exposure to COVID-19, checking levels using a monitor can help you identify poorly ventilated areas. CO_2 measurements should be used as a broad guide to ventilation within a space rather than treating them as 'safe thresholds'.

Outdoor levels of CO_2 are around 400ppm and indoors a consistent CO_2 value less than 800ppm is likely to indicate that a space is well ventilated.

An average of 1500ppm CO_2 concentration over the occupied period in a space is an indicator of poor ventilation. We need to take action to improve ventilation where CO_2 readings are consistently higher than 1500ppm.

However, where there is continuous talking or singing, or high levels of physical activity (such as dancing, playing sport or exercising), providing ventilation sufficient to keep CO_2 levels below 800ppm is recommended.

How can we have good ventilation whilst keeping warm?

Providing adequate ventilation does not mean people have to work in an uncomfortably chilly or cold workplace. There are simple steps you can take to make sure your workplace is adequately ventilated without being too cold:

- Partially opening windows and doors can still provide acceptable ventilation while keeping workplace temperatures comfortable
- Opening higher-level windows will probably create fewer draughts.
- Ensuring all trickle vents are in the open position will provide good, draught free ventilation.
- In occupied rooms relying on natural ventilation, air the space by opening windows and doors as fully as possible to regularly provide additional fresh air. This can be done while people leave the room for a break. For example, 10 minutes an hour can help reduce the risk from virus in the air, depending on the size of the room
- If the area is cold, relax dress codes so people can wear extra layers and warmer clothing
- You could set the heating to maintain a comfortable temperature even when windows and doors are open

How will we monitor levels of CO_2?

Each establishment has been provided with a number of Vision CO_2 monitors. These are simple to use devices, which give a colour-coded visual indicator and numerical reading for the level of CO_2 present in the atmosphere. A 'Blue' or 'Green' display would suggest no need to change ventilation, 'Yellow' or 'Amber' would suggest improving ventilation, and 'Red' or 'Purple' would suggest further investigation/action is required. Staff can use these devices to measure the levels of CO_2 in the learning and teaching spaces across West Dunbartonshire.

An A4 visual guide (at the end of this document) has been produced to show people how to simply take readings, and how to submit these readings via a google form. The A4 visual guide should be displayed in learning and teaching spaces for easy reference.

How do you take a reading?

The Vision CO_2 monitor gives a live reading of the level of CO_2 present in the room, and the display gives a helpful colour-coded visual indicator. Here are a few tips on where to place a monitor, and how to take a reading:

- Measurements should be taken with the room at full occupancy. For classrooms take readings towards the end of the period when CO_2 levels may have built up. If there is adequate ventilation the build-up will not continue to concerning levels.
- Measurements are best taken at the head height of the occupants. This will vary according to occupants and activity.
- Do not take measurements in direct draughts.
- Take measurements in the body of the room, but far enough away from individuals so that direct breath does not affect the monitor (aim for 2 meters)
- Allow time for the readings to stabilise as they may be rising or falling from a previous reading. No significant change for 1 minute is a good guide.
- Take into account any room activity before taking readings. Any burning i.e. gas burners or Bunsen burners, will produce CO_2 and give an elevated reading which does not accurately reflect ventilation for the number of occupants.
- Likewise many science experiments produce CO_2 as a product of a reaction.
- Singing, shouting and exercise will increase CO_2 levels in the room. These should be taken as true readings and additional ventilation may be required for these areas.

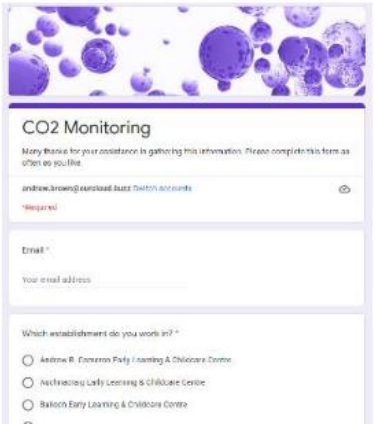
- If you obtain some wildly unexpected readings, in the first instance take your meter outside to check it reads somewhere close to 400ppm. If not, it may need recalibrated – speak to your Head Teacher / Head of Centre in the first instance.

How do you capture a reading?

The Vision CO_2 monitor gives a live reading of the level of CO_2 present in the room. To record the data, simply visit the following google form to record some information:

https://forms.gle/zQ5vzUi1QSndrSYVA

The form asks you to capture a number of pieces of data:



1. **Which Establishment?** Pick the building you are taking the reading in from the list – note – in some cases, this isn't the name of your establishment, as you share a building with others.
2. **What is the 'asset tag' of the space you are monitoring?** Each location has an 'asset tag' – this is a unique reference number for the location you are taking a reading for. (It usually takes the form of a small metal disc attached to the door frame of a room, with a number indicating the level/room – ie 0/123). This is not to be confused with the room name, or classroom number – if in doubt, ask your school office or Head Teacher/Head of Centre.
3. **What date was the reading taken?** Be sure to enter the *date* the reading was taken, especially if you are filling in the form at a later date or time.
4. **What time was the reading taken?** Be sure to enter the *time* the reading was taken, especially if you are filling in the form at a later date or time.
5. **What was the reading?** The Vision CO_2 monitor will display a numerical reading for the level of CO_2 present in the space. This is measured in ppm – parts per million.
6. **How many people were in the room at the time of the reading?** It's important for us to understand the reading submitted to know more about what was happening in the space – the number of people present is an important contributing factor to the levels of CO_2.
7. **What was the activity?** As important to how many people were present is what they were doing. We've tried to make this list as simple as possible, so please choose the one that most closely matches.
8. **How was the space ventilated?** To understand what can be done to assist the levels of CO_2 in a space, we need to know how the space was ventilated when the reading was taken.

The form can be used as often as needed by any user of the space with access to a Vision CO_2 monitor.

What happens with the data?

There are two ways that action can be taken – **locally** and **centrally**, following submission of data.

Action - Locally

As the Vision CO_2 monitoring device provides live readings, some action can be taken locally to improve ventilation.

Between 800 ppm and 1,500 ppm
Where an observed reading is between 800 and 1,500 ppm ('Yellow' or 'Amber' display), consideration should be given to improve the ventilation in the space. This may be as simple as opening doors or windows to increase the ventilation, or it may require discussion with the RPO (Responsible Premises Officer), Head Teacher or Head of Centre.

If ventilation cannot be improved by simple means of opening windows or doors, discussion should be had with the RPO (Responsible Premises Officer), Head Teacher or Head of Centre about the use of the space with a view to reducing the levels of CO_2 present. Could less people be in the space at any one time? Could the space be used differently?

Above 1,500 ppm
Where a reading is above 1,500 ppm ('Red' or 'Purple' display) and all means of ventilating the space and the use of the space have been explored, a case conference will need to be held. To organise a case conference, the RPO (Responsible Premises Officer), Head Teacher or Head of Centre should contact Corporate Health & Safety, who will then facilitate input from Energy & Compliance, Asset Management and Education to determine the best course of action. A case conference will be organised within 24 hours.

Local Health & Safety meetings
It is anticipated that CO_2 monitoring becomes an agenda item at local Health & Safety meetings. Gathered data will be shared with RPOs and Trade Union representatives.

Action - Centrally

The data submitted through the form will be analysed by central officers in Education and Energy and Compliance.

Below 800 ppm (parts per million)
Where a submitted reading is below 800 ppm ('Blue' or 'Green' display), no action will be taken centrally.

Between 800 ppm and 1,500 ppm
Where a submitted reading is between 800 and 1,500 ppm ('Yellow' or 'Amber' display), central Education Officers will raise monthly with the RPO (Responsible Premises Officer), Head Teacher or Head of Centre what has been done to lower readings.

Above 1,500 ppm
Where a reading is above 1,500 ppm ('Red' or 'Purple' display) and all means of ventilating the space and the use of the space have been explored, central officers in Education and Energy and Compliance will bring this to the attention of Corporate Health & Safety, who will then facilitate input from Energy & Compliance, Asset Management and Education in a case conference within 24 hours to determine the best course of action. Action points from this case conference will be captured, and reported to the Learning Estate Project Board.

Joint Health & Safety Committee meetings
It is anticipated that CO_2 monitoring becomes an agenda item at Joint Health & Safety Committee meetings. Analysed totals and areas of concern will be shared with members, and progress to address any concerns reported.

CO_2 Monitoring
(Quick Guide)

West Dunbartonshire COUNCIL

https://forms.gle/zQ5vzUi1QSndrSYVA

Gather Data

SCAN ME

What does the reading tell you?

BELOW 800ppm

NO ACTION REQUIRED

BETWEEN 800 – 1,500ppm

DISCUSSION:
Is the space adequately ventilated?
Is there an alternative to using the space?

ABOVE 1,500ppm

CASE CONFERENCE:
Health & Safety, Education, Asset Management

Up to 600ppm

601 - 800ppm

801 - 1000ppm

1001 - 1500ppm

1501 - 2000ppm

Over 2000ppm