

# Air Quality in Scotland

Welcome to the eleventh Scottish Air Quality Database (SAQD) stakeholder's newsletter. This newsletter is produced on behalf of the Scottish Government by Ricardo Energy & Environment (Ricardo) and is designed to provide regular updates and news regarding the SAQD and local air quality matters to all stakeholders. This may include; updates to the network; new information on air quality issues; updates on changes in policy and procedures; new initiatives and events; technical reports; and how to access data using the Air Quality in Scotland website.

If you have any information which you think would be beneficial to include in a future newsletter, please email us at [aq-monitoring-scotland@ricardo.com](mailto:aq-monitoring-scotland@ricardo.com).

## **NEWS**

### **2019 ANNUAL REPORT HAS BEEN PUBLISHED**

The [Scottish Air Quality Database Annual Report](#) for 2019 has now been published. The report provides a summary of the latest ratified air quality monitoring results for Scotland in 2019 - together with an update on project progress including QA/QC, website improvements, AQ mapping and the annual seminar.

The report also includes information on the air pollutant emissions in Scotland obtained from the National Atmospheric Emissions Inventory and the SEPA Scottish Pollution Release Inventory.

### **AIR QUALITY SCOTLAND BROCHURE 2019 HAS BEEN PUBLISHED**

The [Air Quality Scotland Brochure 2019](#) has now been published. This brochure has been produced on behalf of the Scottish Government and is the twelfth in an annual series. It aims to provide a summary of the air quality monitoring and associated work carried out by and on behalf of the Scottish Government and local authorities during 2019.

### **CLEANER AIR FOR SCOTLAND 2 – DRAFT AIR QUALITY STRATEGY CONSULTATION**

A consultation on a draft new air quality strategy for Scotland, taking into account the recommendations arising from the independent review of the Cleaner Air for Scotland strategy was published on the 30<sup>th</sup> October 2020 and can be found at: <https://consult.gov.scot/environmental-quality/cleaner-air-for-scotland-2>.

In November 2018 the Scottish Government commissioned an independently led review of its Cleaner Air for Scotland strategy, which was published in 2015. The aims of the review were to assess progress to date in implementing the strategy and to make recommendations for additional actions required to deliver further air quality improvements.

A report setting out the conclusions and recommendations arising from the review was published in August 2019. These recommendations have been used to inform the development of a new air quality strategy, which is the subject of this consultation.

### **SAQD STAKEHOLDER MEETING – 2<sup>ND</sup> DECEMBER 2020**

The annual SAQD stakeholder meeting was carried out on the 2nd December with representatives from Scottish Local Authorities

(Aberdeen CC, City of Edinburgh, Glasgow CC and Dundee CC), Scottish Government, SEPA and Transport Scotland attending. Topics discussed included; Covid-19 analysis, Scottish PM inter-comparison study interim results, Latest developments with regards Low Emission Zones (LEZs) and Cleaner Air for Scotland 2 (CAFS2) update.

### CLEAN AIR DAY – 8<sup>TH</sup> OCTOBER 2020

The fourth annual Clean Air Day (CAD) was carried out on the 8<sup>th</sup> October 2020. Many thanks to John Bynorth at Environmental Protection Scotland for the following article contribution!



FIGURE 1. CLEAN AIR DAY LOGO

### CLEAN AIR DAY SCOTLAND HITS THE MARK FOR AIR QUALITY

Environmental Protection Scotland (EPS), the organisers of Clean Air Day in Scotland, have been hailed as 'phenomenal' in the public's response to this year's campaign after social media came alive with pledges to leave the car at home and cycle or walk to improve air quality on October 8<sup>th</sup>.

The campaign, now in its fourth year, and supported by the Scottish Government involved over 130 participating organisers ranging from schools, local authorities, the NHS, charities to grassroots community organisations and companies such as Ricardo.

Clean Air Day bandanas were handed out at a socially distanced event in Edinburgh and schools from the Isle of Skye to the Black Isle, Perth and Kinross, Fife, Stirlingshire, Edinburgh and Glasgow. Bus operators and

businesses promoted the national campaign which became a top trending topic on social media.

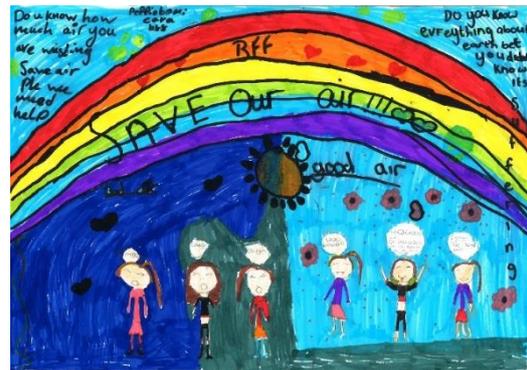


FIGURE 2. COWDENBEATH PRIMARY SCHOOL STUDENT ARTWORK PROMOTING CLEAN AIR DAY

Backed by colourful posters, pledge cards and memes that promoted the environmental and health benefits of cycling, walking and electric vehicles, plus the damage caused by motorists idling their vehicle engines while they are stationary, supporters made a splash on social media.

Ricardo worked with Perth and Kinross and Fife local authorities to engage with staff and pupils in 'virtual' learning experiences at Viewlands Primary in Perth, Robert Douglas Memorial School in Scone, St Dominic's Roman Catholic Primary School in Crieff, Cowdenbeath Primary School, Dairsie Primary School in Cupar and St Margaret's Roman Catholic Primary School in Dunfermline to distribute air quality learning materials. Pupils carried out their own air quality experiments in the playground or classroom and penning verse for a Clean Air Day poetry competition or designed posters with an air quality and environmental theme (see Figure 2). These are to be made into banners for placing outside the school gates.

St Dominic's pupil, Brooke Kingsley-Chase, came top in the poetry competition, beating off 40 other entries, with her prose featuring in the Perthshire Advertiser newspaper.



FIGURE 3. CLEAN AIR DAY PLEDGES FROM PERTH AND KINROSS VIEWLANDS PRIMARY SCHOOL STUDENTS

In Edinburgh, Sciennes Primary School pupils and teachers in Edinburgh gathered in their bandanas before lessons for a photo call. The school is proud of its 'school streets' which have led to a reduction in parents picking up and dropping off pupils by car.

Aberdeen City Council arranged for an artist to draw a beach mural of the Clean Air Day logo on the city's beach and a Gaelic version of the logo found favour among schools and communities too. The Cabinet Secretary for the Environment, Climate Change and Rural Affairs, Roseanna Cunningham, introduced the EPS free Clean Air Day webinar with an address about the links between air quality and climate change.

She praised the campaign for providing an 'opportunity to focus on the benefits of active travel. Leaving our cars at home and opting to walk or cycle instead is a simple way to reduce air pollution, keep fit and help Scotland reach its goal of ending our contribution to climate change by 2045.'

The Causey Development Trust charity held a socially distanced outdoor event in Edinburgh. EPS provided Clean Air Day bandanas and printed off posters and leaflets with advice on the best ways to improve air quality.

Much of the campaign focussed on the school run with parents urged to ditch the car to encourage their children to cycle and walk.

The event had been held over from its traditional date in June due to the national COVID-19 lockdown.

EPS Policy and Communications Officer John Bynorth said: "We were staggered by support for Clean Air Day across Scotland when you considered the difficulties people, businesses and schools are facing currently in their everyday lives.

"We are grateful to Ricardo for their work in encouraging school children to learn more about air pollution, being encouraged to cycle and walk to school and finding out more about the environment impacts of air pollution.

"We had been plugging away for months to promote the event in what are obviously difficult conditions for everyone with lockdown and school disruption. Suddenly about 10 days before the event we had a surge of interest from people wanting to get involved. It is good to see that despite the COVID-19 pandemic, air quality and public health remains high on people's radars.

"The campaign is only in its fourth year in Scotland, so it is still growing, but this year has been phenomenal. People seem to be a lot more aware of the importance of their health since

COVID-19 and are concerned about car use, which is down around 10% one pre-pandemic levels.

John added: "As in previous years, people signed pledge cards with one woman tweeting her card saying she would cycle or walk to the local shops rather than take the car."

Support came from high-profile individuals involved in researching the effects of air pollution. Dr Mark Miller of the University of Edinburgh/British Heart Foundation Scotland Centre For Research Excellence, was pictured with his two daughters wearing Clean Air Day bandanas. Joseph Toner, Head of Devolved Nations for Asthma UK and the British Lung Foundation, and colleagues posted images of themselves in CAD bandanas.

Councillor Lesley Macinnes, convenor of transport and environment at The City of Edinburgh Council, produced a video about the local authority's plans to improve air quality and encourage active travel.

Green Party MSP for Mid Scotland & Fife, Mark Ruskell raised a motion at the Scottish Parliament in support of Clean Air Day yesterday which highlighted the health impacts of air pollution.

Active Travel hubs in Kilmarnock and Ayr produced a pledge card video and Frazer, the co-owner of Edinburgh-based Farr Out Deliveries, put a video camera on his crash helmet and drove a cargo bike to produce a short movie highlighting the air pollution and traffic levels in the capital.

**Contact:** John Bynorth

If your council got involved in any Clean Air Day activities, please feel free to send us an update and we will showcase in our next newsletter. Email information to Ashleigh Norrie (ashleigh.norrie@ricardo.com).

## COVID-19 LOCKDOWN ANALYSIS

Throughout the initial COVID-19 lockdown (March – July 2020), Ricardo on behalf of Scottish Government, carried out a number of preliminary investigative reports and analysis on the effect the restrictions had on Scottish air quality. Provided below is a summary of these report which can all be found in the Technical reports page of the Air Quality in Scotland website.

In addition, in the coming weeks Ricardo will be providing individual Covid-19 lockdown analysis for each Local authority in Scotland. These reports will provide analysis (both modelled and measured) for each automatic monitoring site in the local authority and also compare that with Dft traffic data.

### **Covid-19 lockdown effects on air quality**

This NO<sub>x</sub> and NO<sub>2</sub> analysis focuses on Scottish data from March – April 2020 at a selection of sites across Scotland and uses proven modelling techniques to discount the influence of weather on ambient pollutant concentrations [http://www.scottishairquality.scot/assets/documents/scot\\_covid19\\_analysis.html](http://www.scottishairquality.scot/assets/documents/scot_covid19_analysis.html)

### **Covid-19 lockdown effects on air quality - Update 1<sup>st</sup> May 2020**

This analysis further examines the impact of lockdown measures on evolving ambient air quality data, includes analysis from March - May 2020.

<http://www.scottishairquality.scot/news/reports?view=technical&id=630>

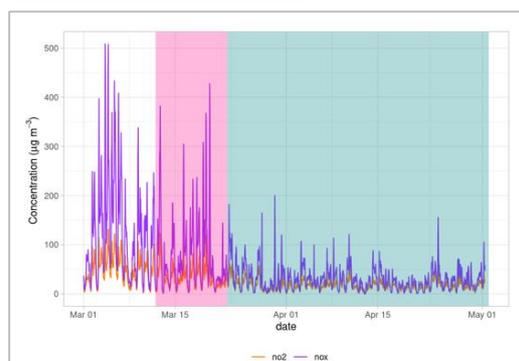


FIGURE 4. DUNDEE LOCHEE ROAD NO<sub>x</sub> LOCKDOWN ANALYSIS

### Time Variance analysis of air quality in Scotland

This report provides time variance analysis of NO<sub>2</sub> PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at eight sites around Scotland from 23rd March – 29th April. Time variance analysis provides average concentrations by day of the week, mean hour of the day and a combined hour of day – day of the week and monthly plots. <http://www.scottishairquality.scot/news/reports?view=technical&id=631>

### Time Variance analysis of air quality in Scotland – Update 27<sup>th</sup> May 2020

This report provides an updated time variance analysis of air quality in Scotland during the Covid-19 travel restrictions, for dates 23<sup>rd</sup> March - 26<sup>th</sup> May.

<http://www.scottishairquality.scot/news/reports?view=technical&id=632>

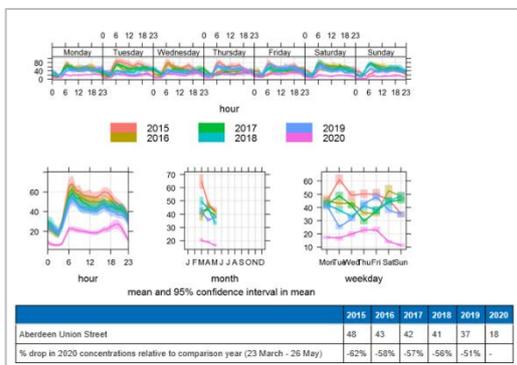


FIGURE 5. ABERDEEN UNION STREET TIME VARIANCE PLOT

### LOCAL AUTHORITY R MARKDOWN INTERACTIVE COVID-19 REPORT

Ricardo are providing each Local Authority with a R markdown interactive report on Covid-19 analysis specific to the automatic sites in their region. The data will include estimated traffic data from the Department for Transport (DfT) (see Figure 1) and will focus on NO<sub>2</sub> and NO<sub>x</sub>. PM data is not included due to the difficulties in accurately modelling PM concentrations. However, PM data comparison can be found in the time variation reports on the website [here](http://www.scottishairquality.scot).

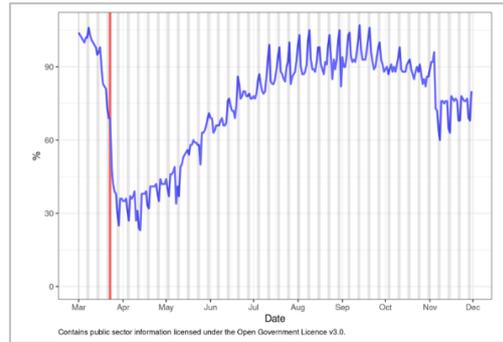


FIGURE 6. DfT STATISTICS ILLUSTRATING THE CHANGE IN ROAD TRAFFIC DATA FOR ABERDEEN (MAY 2020 – DEC 2020)

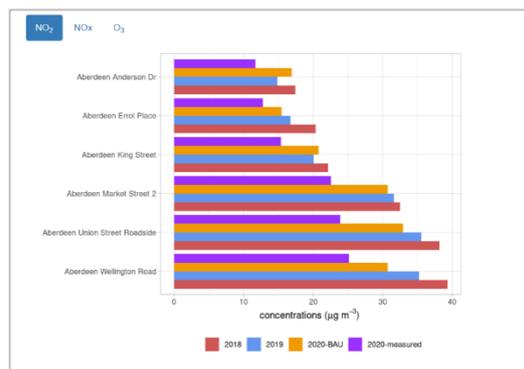


FIGURE 7. COMPARISON OF ANNUAL AVERAGE NO<sub>2</sub> CONCENTRATIONS WITH BUSINESS AS USUAL (BAU) AND MEASURED AVERAGES FOR 2020 FOR ALL ABERDEEN AIR QUALITY MONITORING SITES

### SCOTLAND'S AIR QUALITY DATABASE: WHO, WHY AND HOW?

Scottish Government has given The University of Stirling permission to carry out a survey on why and how we use Scottish air quality information. The survey comes in the format of a short web based questionnaire which can be accessed here <https://stirling.onlinesurveys.ac.uk/scotlands-air-quality-database-who-why-and-how-3>. In addition, there is a short section in the questionnaire which relates to air quality and the Covid-19 pandemic. If you have a moment please participate.

## SCOTTISH ENVIRONMENT PROTECTION AGENCY (SEPA)

### GLASGOW'S LOW EMISSION ZONE (LEZ) AND COVID-19 LOCKDOWN

Glasgow City Council introduced Scotland's first LEZ in December 2018. The initial focus was improving bus emissions through a phased increase in Euro VI bus journeys. By the end of 2019, just over 40% of city centre bus journeys were made by Euro VI buses. At the same time, levels of nitrogen dioxide (NO<sub>2</sub>) began to decrease along the main bus routes, with Hope Street monitoring data exhibiting reductions in hourly NO<sub>2</sub> concentrations over 100 µg/m<sup>3</sup>.

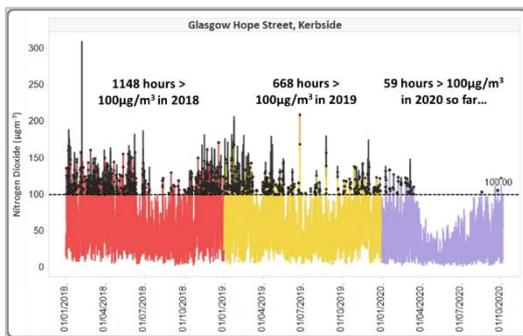


FIGURE 8. GLASGOW HOPE STREET NO<sub>2</sub> ANALYSIS FROM 2018 – PRESENT

COVID-19 lockdown measures introduced in March 2020 saw a dramatic reduction in traffic volumes across the city with traffic data providing an insight into how traffic flows and fleet composition changed during this period.

SEPA has developed a series of data visualisation tools which allow an assessment of how the LEZ was performing before lockdown and how the pandemic has affected traffic behaviour. This provides an opportunity to consider how transport systems can be improved to maximise air quality and climate change benefits.

To see a more detailed analysis of air quality relating to the Glasgow LEZ and the impact of the COVID-19 lockdown then please visit these SEPA data tools hosted on LEZ Scotland website.

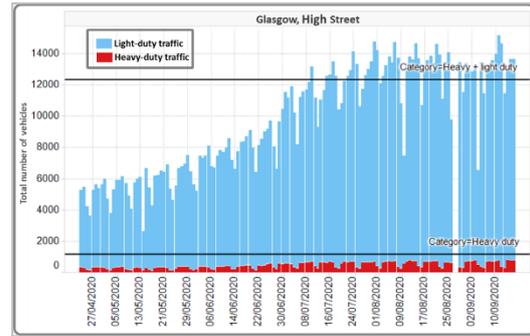


FIGURE 9. SEPA DATA VISUALISATION TOOL – GLASGOW HIGH STREET

### SEPA AIR QUALITY DATA VISUALISATION TOOLS

SEPA has created a series of live visualisation tools to present domestic and European Environment Agency (EEA) air quality data for a range of pollutants (fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), ground-level ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub> and NO<sub>2</sub>)).

These show simple visual comparisons both domestically and between European nations helping to draw existing data together by accessing data from the air quality data download service provided by the EEA (this is publicly available, and no additional interpretation/analysis of the data takes place).

The chart below shows how the tools were used to compare how air quality changed across Europe as COVID-19 lockdown measures were introduced during March 2020.

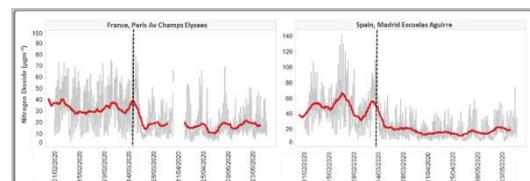


FIGURE 10. LIVE VISUALISATION TOOLS COMPARING PARIS AND MADRID AIR QUALITY DURING COVID-19 LOCKDOWN

The European Air Quality Tool displays air quality observations from across Europe going back to 2013, the European Air Quality Live Data Tool displays recent air quality observations from across Europe typically for the most recent two days (this comprises data from the EEA and additional data for Scotland from the Scottish Air Quality Database (SAQD)) and the UK Air Quality Tool displays recent air quality observations from across the UK. These tools are hosted on the Scotland's Environment

Website (<https://www.environment.gov.scot/data/data-analysis/>).

### DEANSTON PRIMARY SCHOOL LEARNS ABOUT AIR POLLUTION

In the lead-up to this year's Clean Air Day, pupils from Deanston Primary School, in Stirlingshire, undertook practical studies to learn about air pollution. Mrs Ashworth's P4-7 class worked through the free on-line air quality teaching package ([www.learnaboutair.com](http://www.learnaboutair.com)) and participated in SEPA's school banner competition.

The pupils learnt about air pollution, the main sources and health effects. Using simple experiments, the class investigated how lifestyle choices can contribute to air pollution. Keen to get their message out, the pupils tweeted "We had a visual of how much air pollution we each produce, bit scary for the bath loving, diesel car owners among us! Thanks to SEPA for the great lesson ideas".



FIGURE 11. CLEAN AIR DAY ACTIVITIES IN STIRLINGSHIRE

The class were keen to investigate how pollution levels changed near the school. "Our home-made air monitors gave us a clear idea of the most polluted air in our local area. Top tip - don't stand on the Teith Bridge for long!" Georgia MacDonald, winner of the class banner competition, provided an excellent banner and message "Have some care, for the air!"

To participate in future banner completions contact [colin.gillespie@sepa.org.uk](mailto:colin.gillespie@sepa.org.uk) and to use the free on-line resource visit the teaching package: [www.learnaboutair.com](http://www.learnaboutair.com).

Contact: Graham Applegate

## LOCAL AUTHORITY EXPERIENCE

In this section, we plan to showcase local authority's contribution to Local Air Quality Management (LAQM). The aim of this section will be to provide information on what air quality initiatives the local authority is undertaking, and the experiences gained. If you would be interested in contributing, please send an email to [info@scottishairquality.co.uk](mailto:info@scottishairquality.co.uk). Many thanks to Nick Thornton at The Highland's Council for this newsletter's contribution!



Air quality in The Highland Council area is generally very good however an AQMA has been declared for a small geographic area in Inverness city centre around the junction between Academy Street and Queensgate, in the old town of the city. The streets in this area are narrow canyons. Academy Street is one of the main cross-city through routes. The bus station is serviced by this junction and Queensgate is a major bus stopping point. The one-way system means that buses on most routes pass through the AQMA at least twice when passing through the city. Relevant exposure in the AQMA is flattened accommodation at first floor or above. The AQMA was declared for nitrogen dioxide.

Automatic NO<sub>2</sub> monitoring has been undertaken within the AQMA since 2016. In 2019 the council received Scottish Government funding to install a second automatic monitor. The second monitor has an intake at first floor level within the street canyon, where there is relevant exposure. It sits around four metres above the existing monitor intake that is at street level. A full year of data for both monitors is not yet available.

The local bus company operate 6 full electric buses on routes through the AQMA.

In 2020 funding was secured for 7 low-cost real-time analysers. The plan is to use these to inform work around the AQMA, and as part of a school's education project, or to investigate other possible pollution hotspots. It is expected to progress this work early in 2021 when COVID19 allows.

### SAQD QAQC ACTIVITIES

Ricardo have begun carrying out the winter six monthly audits. Ricardo will contact each local authority in advance to confirm the date of the scheduled audit. Ricardo are continuing to adhere to the 72-hour rule for Covid-19, please inform Ricardo if your council or Engineer Support Units (ESU) have been to site within this period. If there are new Local Site Operators (LSO) that require full training, please let Ricardo know in advance and we will arrange training during the audits.

An audit summary will be sent to you after each audit visit. If you have not received an audit summary, please contact [aq-monitoring-scotland@ricardo.com](mailto:aq-monitoring-scotland@ricardo.com).

### LOCAL AIR QUALITY MANAGEMENT (LAQM)

We would like to say a massive thank you for the great response regarding the LAQM reports! If you haven't already, can you please forward your current and historic LAQM reports to [david.hector@ricardo.com](mailto:david.hector@ricardo.com) for upload to the SAQD website. <http://www.scottishairquality.co.uk/laqm/tools>

### QUESTION AND ANSWERS SECTION

This section will provide answers to frequently asked questions that relate to different aspects of LAQM ranging from Local Site Operator (LSO) duties to advanced data analysis queries. If you

have a question you would like to be answered in this section, please contact [aq-monitoring-scotland@ricardo.com](mailto:aq-monitoring-scotland@ricardo.com).

*Q: How can you tell a pollution episode is occurring whilst at site?*

*A:* The trigger levels in the table indicate a pollution episode. If the analyser is showing concentrations in excess of these levels the analysers must not be calibrated and a visit to

Table 1. Table of pollutants and their trigger levels for a pollution episode

the site should be rearranged. Ideally calibrations should not be carried out during periods of known elevated concentrations (i.e. rush hours).

Pollutant	Level
NO <sub>2</sub>	75 ppb
O <sub>3</sub>	70 ppb
PM <sub>10</sub>	100 µg/m <sup>3</sup>
SO <sub>2</sub>	90 ppb
CO	10 ppb

*Q: Can LSO's still attend site during the Winter audit run for training opportunities or questions?*

*A:* Yes, please let Ricardo know in advance of the audit to arrange an appropriate time to meet on site. All social distancing measures will be adhered to during training and facemasks will be worn. For more information on all the network's analysers, please see the LSO manual at <http://www.scottishairquality.scot/laqm/lso-manual>

## STAY CONNECTED

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