

# LOW COST SENSOR TRIAL IN MELBOURNE ACROSS VICTORIA

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Environment  
Protection  
Authority Victoria



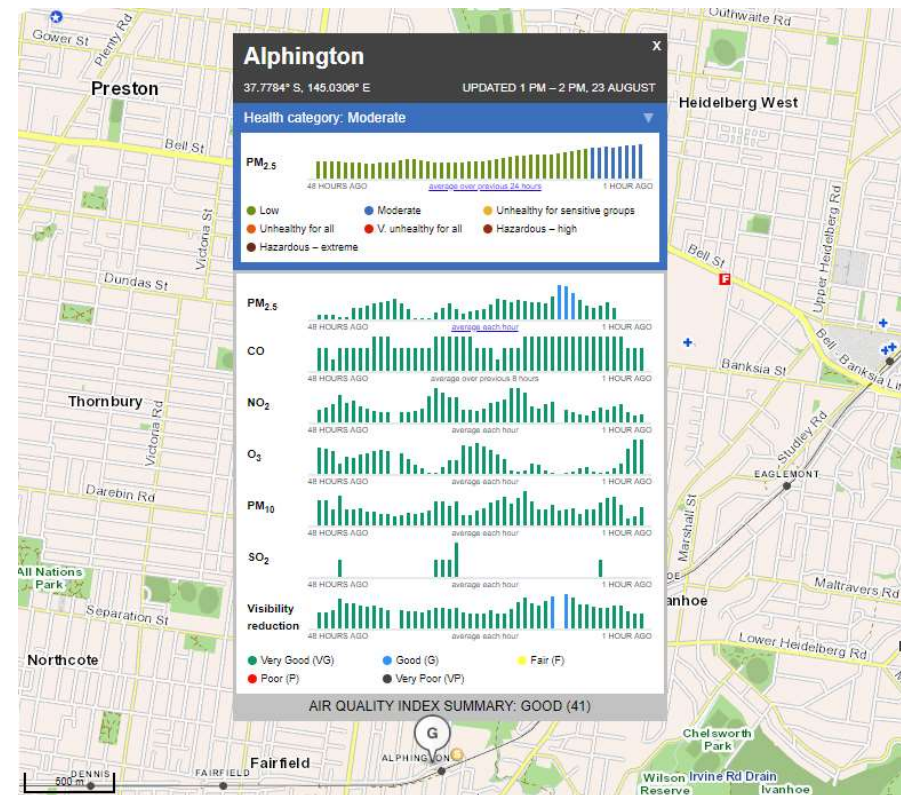
# Monitoring as part of an air quality assessment program

Long term trends and changes

Reporting against standards

Information during air pollution events

Need for high quality data that meets community expectations and Australian Standards



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# Current network can't deliver everything we want

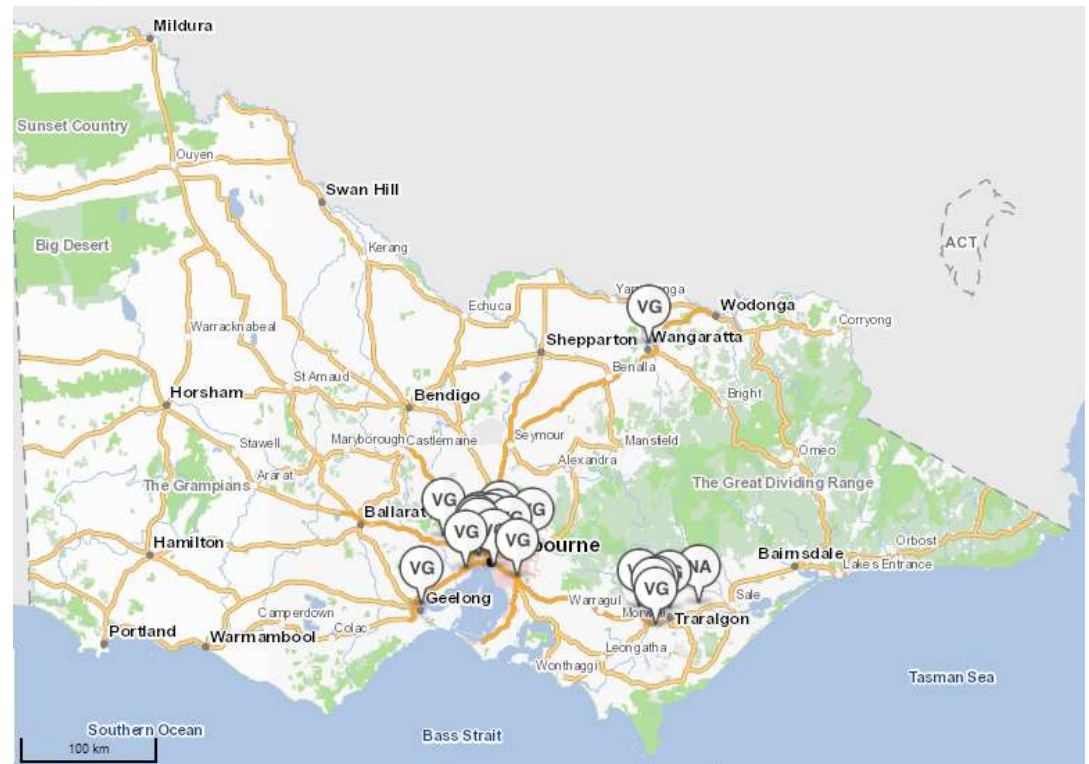
The current network does many things, but it can't do everything we want it to

EPA currently monitors at 19 locations around the state

Primarily in the Melbourne and Latrobe Valley air sheds

While the current network covers a large part of the population

There is recognition that there are areas which aren't monitored



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# low cost sensors as part of a assessment program

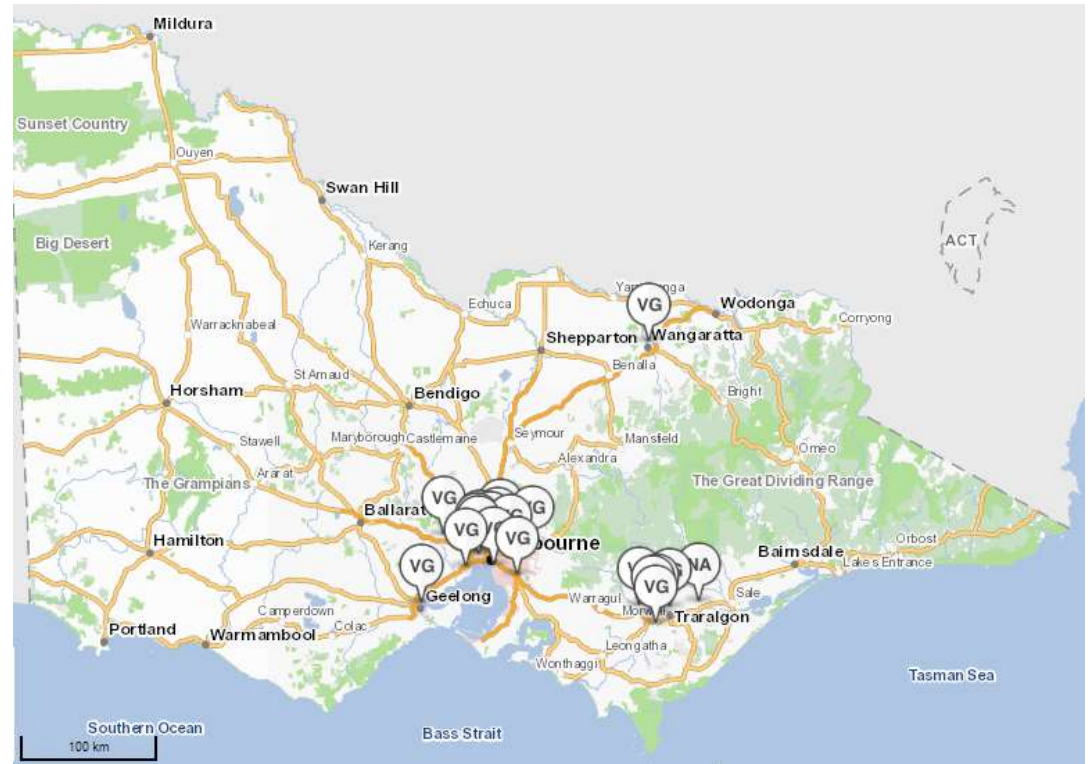
Many different technologies that can be considered

Core instruments in the network can cost 10's of thousands

Low cost sensors can be less than \$100

Important to remember that low cost sensor doesn't mean low cost network / system

There's also emissions inventories and modelling



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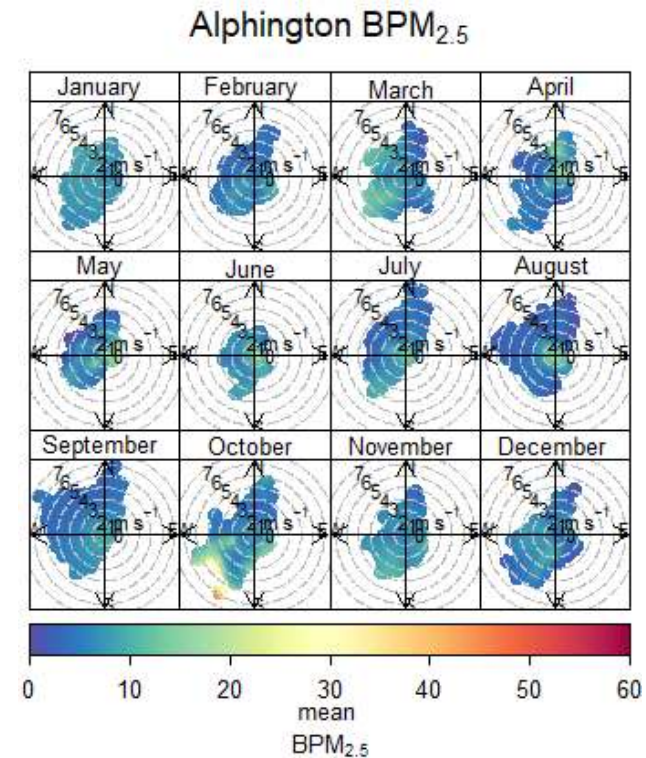


# low cost sensors as part of a assessment program

This is **NOT** about trying to replace high cost standard particle monitors with cheaper ones.

This **IS** about making our particle monitoring networks more effective and more useful by adding different sensors

And not just a few more, but hundreds, or even thousands, more.



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# Air pollution events – smoke effects from fires

Desire to get some indicative data from as many places as possible

And quickly!

Emergency response criteria need to be known for response decisions



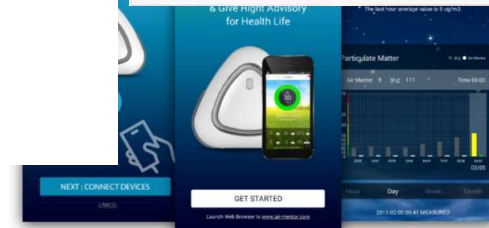
# There are many many low cost sensors

Many types of low cost sensors

Typically based on a optical laser type sensor

New features constantly appearing

Better display and transfer of data, wifi and internet (of things)



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# Deployment of low cost sensors to Queen's bridge

EPA collaboration with citipower in 2016

Two units installed

Data was quite good, ability to pick up differences in traffic

Some challenges including access for installation and maintenance



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# Deployment of low cost sensors to Fitzroy gardens

Solar powered, wireless communications

Easy to setup

Initially in Fitzroy gardens, worked quite well



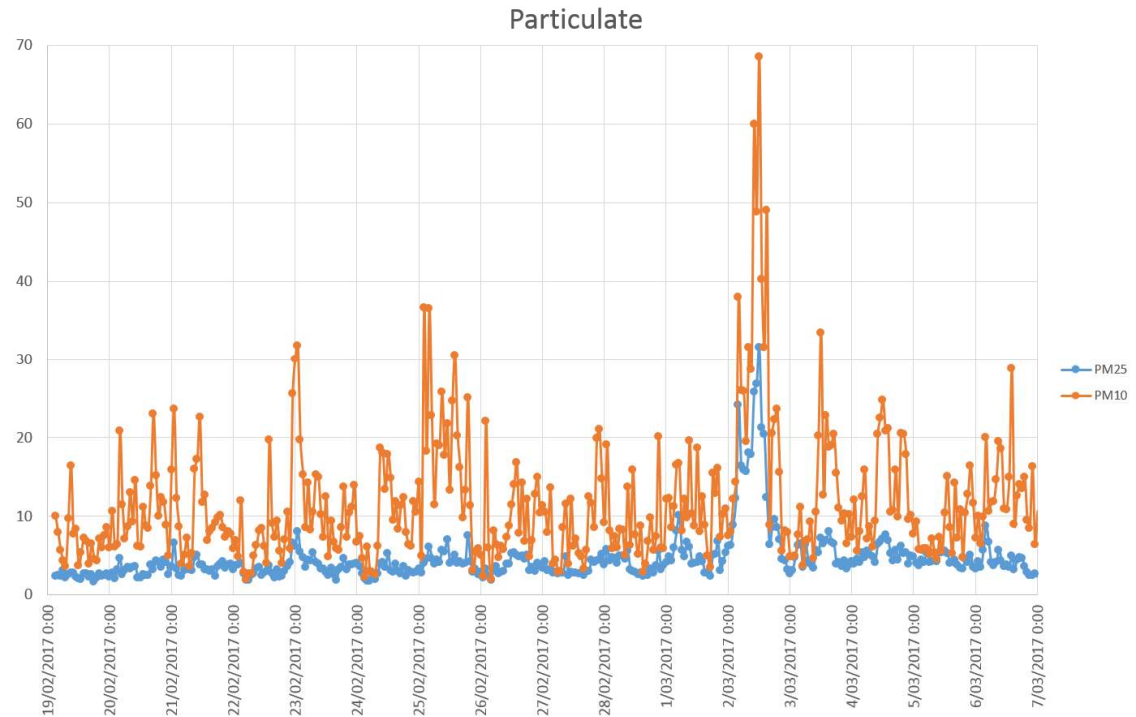
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# Results from Fitzroy

19 Feb to 7 Mar 2017

Hourly PM<sub>10</sub> and PM<sub>2.5</sub>

Got the 'poor' air quality day on 2 March



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## Next step, Geelong and Melbourne CBD AAMS

Next step was to test next to EPA standard equipment

Installed at Geelong and Melbourne CBD

Lots of data to analyse!



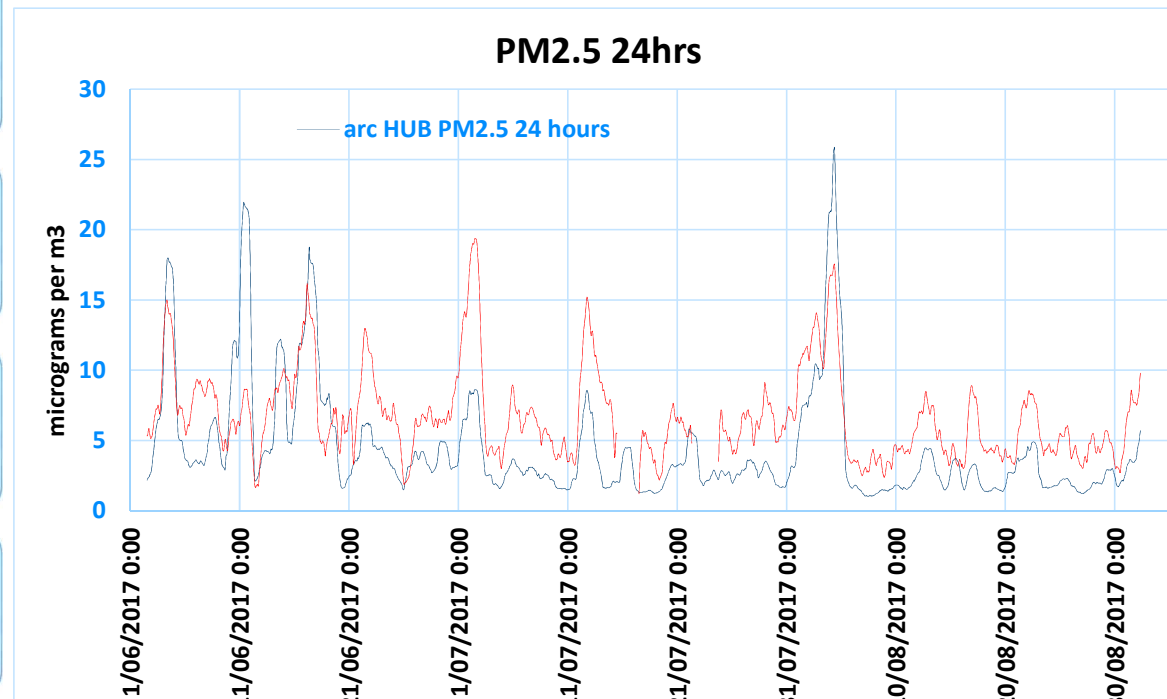
## Geelong Results (part 2)

Comparison with standard EPA instrument

Slightly lower readings from low cost sensor

Overall it tracks similar peaks

We can use this data to correct the sensor



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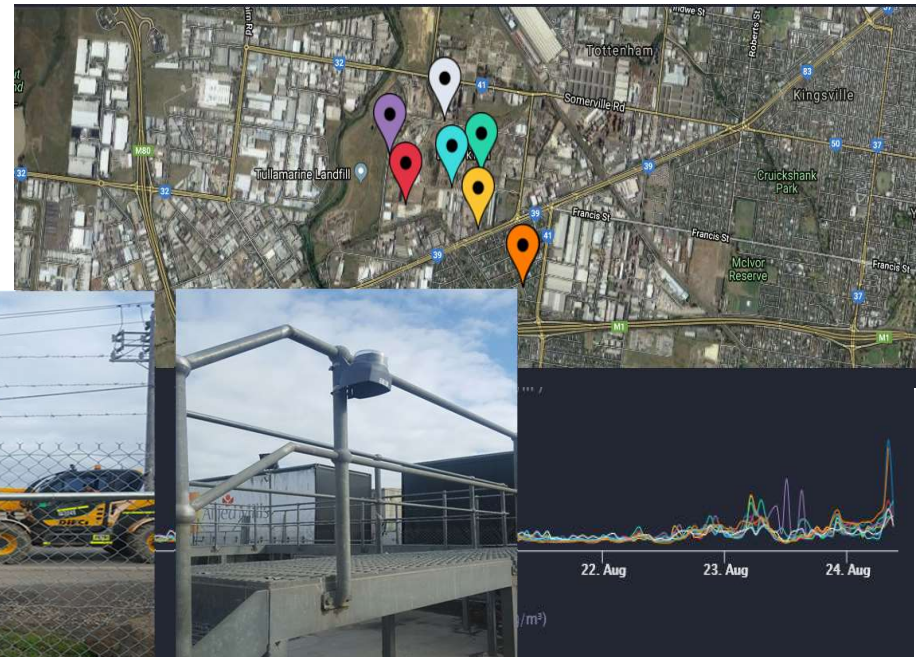


# Sensors in Brooklyn

7 sensors along with the EPA standard instrument

Complex area, lots of different potential sources which vary depending on the conditions

Greater spatial data can give better understanding of which interventions are doing

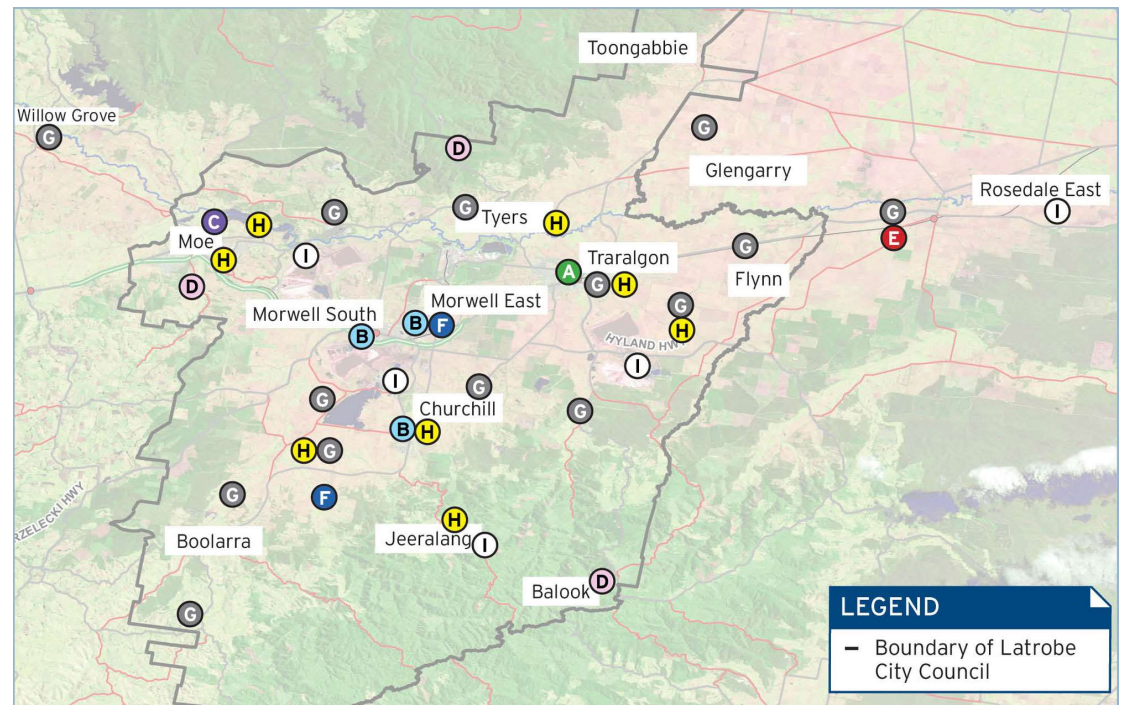


# Latrobe Valley monitoring network

Example of how EPA is looking to use low cost sensors

Standard instruments supported by a network of low cost sensors

Calibrate the network using the standard instruments



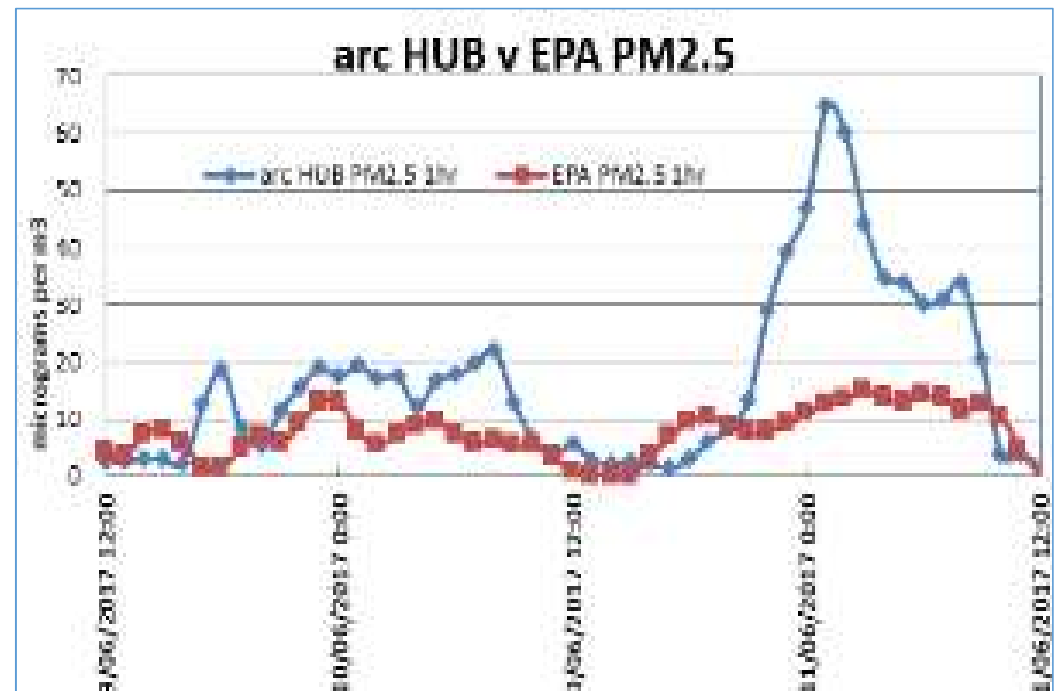
# Foggy days

EPA particle instruments have a heated inlet to deal with humidity

Heating the inlet can use lots of power

Low cost sensors usually don't have the power to spare for heating

Can be impacted by fog and high humidity, especially on cold mornings and nights



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# Conclusions and future steps

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EPA is looking at different ways to monitor air quality,

Assessment of air quality, not just monitoring so need to consider inventories and modelling

we will still have high quality air quality monitoring that meets Australian Standards,

but we want to monitor in more places

We need to use technology that can be moved quickly to meet different needs

Need to consider what the technology can and can't do

Technology is rapidly changing and getting better

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