

Annual Progress Report (APR)



2017 Air Quality Annual Progress Report (APR) for
South Ayrshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

Date June 2017

Local Authority Officer	Gordon Lauder
Department	Environment, Neighbourhood and Economy
Address	3rd Floor Burns House, Burns Statue Square, Ayr KA7 1LU
Telephone	01292 618222 direct dial 01292 616229
E-mail	Gordon.lauder@south-ayrshire.gov.uk
Report Reference number	SAC/PR/2017
Date	June 2017

Executive Summary: Air Quality in Our Area

South Ayrshire Council (SAC) has carried out a review of air quality within South Ayrshire which fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the report follows technical guidance LAQM.TG(16), (Reference1), issued by the Scottish Government to assist Local authorities in their Review and Assessment of air quality.

The report forms our 2017 Progress Report (PR) and includes latest available data up to the end of 2016. It also considers the conclusions of the previous rounds of Review and Assessment and any changes that have occurred since then that would have an effect on local air quality.

The report sets out the results of air quality monitoring carried out by South Ayrshire Council and considers the potential impacts from a range of sources such as road traffic and other transport emissions, industrial processes, commercial and domestic fuel use and fugitive emission sources.

The Progress Report concluded that concentrations of the various air quality objectives are unlikely to be exceeded.

A detailed assessment is therefore not required for South Ayrshire Council.

An annual progress report will be submitted to the Scottish Executive by the end of June, 2018.

Air Quality in South Ayrshire Council

Fortunately, the air quality in South Ayrshire is generally very good. This is mainly due to the fact that there is little in the way of heavy industry, the majority of the pollution arising from road vehicles. There are no designated air quality management areas (AQMA's) in South Ayrshire, However we are not complacent and continue to carry out monitoring using two real time monitors for NO₂ and PM₁₀/ PM_{2.5} and a network of 20 NO₂ diffusion tubes. With the assistance of our partners at Police Scotland and Glasgow City Council, we also undertake roadside vehicle emission monitoring throughout the district each year in an attempt to have the most polluting vehicles removed from our roads.

Actions to Improve Air Quality

In conjunction with our partners at North Lanarkshire Council, Glasgow City Council, Police Scotland and VOSA, We carried out vehicle emission testing on 20 days in 2015. SAC has no AQMAs or action plans.

Local Priorities and Challenges

The majority of the air quality pollutants arising within SAC are as a result of road traffic. Therefore, in order to remove the most polluting vehicles from our roads, we intend to carry out further vehicle emission testing over the coming year. With the assistance of funding from the Scottish Government we fitting our two real-time TEOM monitors with PM_{2.5} inlets in order to assess the levels of that pollutant within SAC.

How to Get Involved

Our website has links to the two real time monitors results for PM_{2.5} and NO₂. This can be accessed as follows: <http://www.south-ayrshire.gov.uk/environmentalhealth/publichealth/airqualitylive.aspx>

Table of Contents

Executive Summary: Air Quality in Our Area	i
1. Local Air Quality Management	1
2. Actions to Improve Air Quality	2
2.1 Air Quality Management Areas.....	2
2.2 Cleaner Air for Scotland	7
2.2.1 Transport – Avoiding travel – T1	7
2.2.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2.....	7
3. Air Quality Monitoring Data and Comparison with Air Quality Objectives	8
3.1 Summary of Monitoring Undertaken	8
3.1.1 Automatic Monitoring Sites	8
3.1.2 Non-Automatic Monitoring Sites.....	8
3.2 Individual pollutants.....	8
3.2.1 Nitrogen Dioxide (NO ₂).....	8
3.2.2 Particulate Matter (PM ₁₀).....	9
3.2.3 Particulate Matter (PM _{2.5})	9
3.2.4 Sulphur Dioxide (SO ₂).....	9
We did not monitor SO ₂ concentrations during 2015 within SAC.	9
We are not aware of any changes that have occurred in their status since submission of the previous report 2.2.3	Sulphur Dioxide 9
Previously monitoring was by means of two eight port bubblers, one at Dundonald Activity Centre and the other at the Road Depot within Grangeston Industrial Estate Girvan. Analysis of the solution took place at Glasgow Scientific Services.	9
Monitoring ceased at Dundonald at the end of 2006 and at Girvan at the end of 2007.	9
The results of that monitoring indicated that there would be no exceedances of the objective standard as was reported in South Ayrshire Council's 2008 Progress Report.....	9
3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene	9
4. New Local Developments	10
6. Conclusions and Proposed Actions	11
6.1 Conclusions from New Monitoring Data.....	11
6.2 Conclusions relating to New Local Developments	11
6.3 Proposed Actions	11
Appendix A: Monitoring Results	12
Appendix B: Full Monthly Diffusion Tube Results for 2016	23
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	24

Appendix D: Trend of Non Automatic NO₂ Results 2011 - 2016...25
Appendix E: Trend of Automatic NO₂ Results 2011 – 2016.....26
Appendix F: South Ayrshire Council Energy Strategy.....27
References 45

List of Tables

Table 1.1 – Summary of Air Quality Objectives in Scotland1
Table 2.2 – Progress on Measures to Improve Air Quality.....3

List of Figures

**Figure 1: Map showing Location of High Street Ayr Real Time Continuous
Monitoring Station.....46**
**Figure 2: Map showing Location of Taylor Street, Ayr Real Time Continuous
Monitoring Station.....47**

1. Local Air Quality Management

This report provides an overview of air quality in South Ayrshire Council during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by South Ayrshire Council to improve air quality and any progress that has been made.

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m ³	Annual mean	31.12.2005
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual mean	31.12.2020
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-Hour mean	31.12.2003
Lead	0.25 µg/m ³	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

South Ayrshire Council currently does not have any AQMAs.

2.2 Progress and Impact of Measures to address Air Quality in South Ayrshire

South Ayrshire Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Key completed measures are: the introduction of electric vehicles and charging points to the council fleet and the introduction of an active travel hub at Ayr railway station.

South Ayrshire Council expects the following measures to be completed over the course of the next reporting year: the feasibility of a car club within South Ayrshire.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1.	Active Travel Hub project	Alternatives to private vehicle use	in partnership with ARA, Sustrans, Community Transport and others this initiative has promoted modal shift in particular to walking and cycling,	Sustainability section, Neighbourhood Services				Potential reduction in private vehicle use so this project is seeking to actively reduce air pollution In particular NOX and PM	Complete – now operational		actively reducing air pollution
2.	Introduction of a car club	Alternatives to private vehicle use	The feasibility of a car club in South Ayrshire. Initial results are very positive and demonstrate that moving to a car club would reduce air pollution as it shows that replacing both council grey fleet miles and / or residential miles with car club miles would mean more efficient cars in terms of pollution (as well as safety and emissions) would be travelling those miles.	Sustainability section, Neighbourhood Services				PM and NOX	Report commissioned into feasibility. Feedback very positive	2017	Analysis suggests that introduction would lead to an overall reduction in miles and the possibility that some people would no longer run a car or second car, which would also be positive for air quality

South Ayrshire Council

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3.	Bicycle Rental	Alternatives to private vehicle use	the aim of having a hub in place at Ayr Station by July 2016 which will rent out bikes, and provide information about all forms of active travel and alternatives to private car use	Sustainability section, Neighbourhood Services				PM and NOX	Complete		
4.	Green Champions	Alternatives to private vehicle use	Within the Council our Green Champions Network continues to promote active travel and the council's travel hierarchy. Active travel is also being promoted to our 9 secondary schools through the Provost's School Footprint Challenge and to our primary schools through our joint work with the Energy Agency to provide energy lessons and run the calendar competition	Sustainability section, Neighbourhood Services					ongoing	2017	
5.	Promotion of renewable Energy	Promoting low emission plants	The Energy Agency, who we work in partnership with, have been working with us on the promotion of renewable energy and energy efficiency..	Sustainability section, Neighbourhood Services					ongoing	ongoing	This contributes to a move away from the burning of fossil fuels and any air quality detriment associated with this
6.	Vehicle fleet efficiency	Promoting low emission transport	Several electric vehicles are being procured for use by council staff. In addition a number of charging points are being installed throughout the district	Fleet section, Neighbourhood Services							

South Ayrshire Council

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7.	Vehicle fleet efficiency	Promoting low emission plant	Electric bin lifting equipment where possible will be fitted to all RCVs. This results in the vehicle engine operating at lower revs (when lifting bins) which reduces fuel consumption, vehicle exhaust emissions and noise levels.	Fleet section, Neighbourhood Fleet section, Neighbourhood Services				PM10, NO2	Ongoing	Phased rollout	
8.	Vehicle fleet efficiency	Promoting low emission transport	Large Goods Vehicles (LGVs) over 3500kg GVW will also be fitted where possible with the latest technology to reduce fuel consumption and exhaust emissions. Certain vehicles will be fitted with in-cab heaters to stop the practice of vehicles idling in cold weather to defrost windows etc. This practice greatly increases fuel consumption and results in exhaust gases being emitted unnecessarily.					PM10, NO2	Ongoing	Phased rollout	
9.	Vehicle fleet efficiency	Promoting low emission transport	HGV's will have engines which are all built to the latest European legal limits on exhaust gases (Euro 6) specification. Which will result in the vehicles emitting the lowest possible exhaust gases.	Fleet section, Neighbourhood Services				PM10, NO2	Ongoing	Phased rollout	
10.	Vehicle fleet efficiency	Promoting low emission transport	Cars, minibuses, vans & pick-ups up to 3500GVW where possible will be fitted with speed limiters, rev limiters and stop/start technology to maximise fuel efficiency and reduce exhaust emissions.	Fleet section, Neighbourhood Services				PM10, NO2	Ongoing	Phased rollout	

South Ayrshire Council

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
11.	Vehicle fleet efficiency	Promoting low emission transport	Departments will also be asked to identify where smaller vans can replace larger vans and if using electric vehicles (EVs) could be an option. Although unfortunately at this time the infrastructure of charging points will restrict the number of EVs we can put into our fleet.	Fleet section, Neighbourhood Services				PM10, NO2	Ongoing	Phased rollout	
12.	Vehicle fleet efficiency	Promoting low emission transport	Part of the Fleet Management Review is developing and putting in place a hierarchy of travel guidelines. This will advise our staff the most economical and environmental friendly way of travel mode. This should identify and reduce unnecessary journeys and again reduce the Councils carbon usage.	Fleet section, Neighbourhood Services				PM10, NO2	Ongoing	Phased rollout	
13.	Vehicle fleet efficiency	Promoting low emission transport	The vehicle tracking system has also help reduce our fuel usage by identify routes where vehicles were passing each other on journeys to jobs. In particular this applied to our Property Maintenance section. The system now allows the nearest vehicle to attend call-outs etc.	Fleet section, Neighbourhood Services				PM10, NO2	Ongoing	Phased rollout	

⋮

2.2 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland’s legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at <http://www.gov.scot/Publications/2015/11/5671/17>. Progress by South Ayrshire Council against relevant actions within this strategy is demonstrated below.

2.2.1 Transport – Avoiding travel – T1

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan. South Ayrshire Council is currently reviewing its corporate travel plan. Within it there will be a hierarchy for travelling starting off with “do I really need to travel at all” to walking, using public transport with driving as a last resort.

2.2.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. South Ayrshire Council has an energy strategy. Saved in appendix F

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

South Ayrshire Council undertook automatic (continuous) monitoring at 2 sites during 2016. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at <http://www.scottishairquality.co.uk/>

Maps showing the location of the monitoring sites are provided in Figures 1 and 2. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

South Ayrshire Council undertook non- automatic (passive) monitoring of NO₂ at 20 sites during 2016. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 3. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual pollutants

Appendices D, E and F display trends of monitoring over the last 5 years.

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

There were no exceedances of the air quality objectives for NO₂ within SAC during 2016. Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

3.2.2 Particulate Matter (PM₁₀)

There were no exceedances of the air quality objectives for PM₁₀ within SAC for 2016.

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of 18µg/m³.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m³, not to be exceeded more than 7 times per year.

3.2.3 Particulate Matter (PM_{2.5})

There were no exceedances reported for PM_{2.5} in 2016.

Table A.7 in Appendix A compares the ratified and adjusted monitored PM_{2.5} annual mean concentrations for 2016 with the air quality objective of 10µg/m³.

3.2.4 Sulphur Dioxide (SO₂)

We did not monitor SO₂ concentrations during 2015 within SAC.

We are not aware of any changes that have occurred in their status since submission of the previous report 2.2.3 Sulphur Dioxide

Previously monitoring was by means of two eight port bubblers, one at Dundonald Activity Centre and the other at the Road Depot within Grangeston Industrial Estate Girvan. Analysis of the solution took place at Glasgow Scientific Services.

Monitoring ceased at Dundonald at the end of 2006 and at Girvan at the end of 2007.

The results of that monitoring indicated that there would be no exceedances of the objective standard as was reported in South Ayrshire Council's 2008 Progress Report.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

We did not undertake any monitoring for Carbon Monoxide, Lead or 1,3-Butadiene within SAC in 2015.

We are not aware of any changes that have occurred in their status since submission of the previous report.

4. New Local Developments

We are not aware of any new local developments within SAC that may affect air quality.

4.1 Road Traffic Sources

We are not aware of any new road traffic sources within SAC that have the potential to affect air quality.

4.2 Other Transport Sources

We are not aware of any other transport sources within SAC that has the potential to affect air quality.

4.3 Industrial Sources

The only new industrial installation or substantially changed industrial installation that we are aware of within SAC that has the potential to affect air quality is a new CHP plant at Troon Harbour. The air quality impact assessment showed that none of the air quality objectives would be breached. The report will be uploaded with this progress report.

4.4 Commercial and Domestic Sources

There are no new commercial or domestic sources we are aware of within SAC that would have the potential to affect air quality

4.5 New Developments with Fugitive or Uncontrolled Sources

There are no new developments we are aware of within SAC that would have the potential to produce a source of fugitive or uncontrolled particulate matter.

5. Planning Applications

There are no new planning applications we are aware of within SAC that would have the potential to affect air quality.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

There were no exceedances of the air quality objectives identified within SAC during 2016.

6.2 Conclusions relating to New Local Developments

There were no local developments during 2016 in SAC that required consideration.

6.3 Proposed Actions

There were no exceedances of the air quality objectives identified within SAC in 2016. Therefore there is no need to progress to a detailed assessment nor is there any need to consider air quality management areas.

Our next Progress Report is due by the end of June 2018.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
CM1	High St Ayr	Roadside	337223	221162	NO ₂ ; PM ₁₀ / PM _{2.5}	N	Chemiluminescent; FDMS	5	2	2.0
CM2	Taylor St (Harbour) Ayr	Roadside	233608	622750	NO ₂ ; PM ₁₀ / PM _{2.5}	N	Chemiluminescent; FDMS	10	1	2.0

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT1	30 Main Street Loans	Roadside	2334529	631708	NO ₂	N	10	2	N
DT2	Dundonald Rd Troon	Roadside	232588	631277	NO ₂	N	10	2	N
DT3	2 Portland St Troon	Roadside	232292	631235	NO ₂	N	10	2	N
DT4	Shawfarm Gardens Prestwick	Roadside	235622	626548	NO ₂	N	5	1	N
DT5	3 The Cross Prestwick	Roadside	235229	626228	NO ₂	N	5	2	N
DT6	141 Main St Prestwick	Roadside	235142	625816	NO ₂	N	2	2	N

South Ayrshire Council

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT7	Heathfield Rd / Prestwick Rd. Ayr	Roadside	234641	624159	NO2	N	2	1	N
DT8	Station Taxi Rank Smith St Ayr	Roadside	240194	624754	NO2	N	5	1	N
DT9	Morrisons Castlehill Rd Ayr	Roadside	232153	621149	NO2	N	5	2	N
DT10	39 Whitletts Road Ayr	Roadside	234605	622412	NO2	N	2	N/A	N
DT11	Tesco Whitletts Rd Ayr	Roadside	235150	622528	NO2	N	10	2	N
DT12	King St. Ayr	Roadside	233830	622352	NO2	N	2	1	N

South Ayrshire Council

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT13	Town Buildings Ayr	Roadside	233691	622093	NO2	N	2	2	N
DT14	1 AQ (N) Station, Ayr	Roadside	233701	622114	NO2	N	5	2	Y
DT15	2 AQ (W) Station, Ayr	Roadside	233701	622114	NO2	N	5	2	Y
DT16	3 AQ (S) Station, Ayr	Roadside	233701	622114	NO2	N	10	2	Y
DT17	Rozelle Park Ayr	Urban Back-ground	233763	618944	NO2	N	10	N/A	N
DT18	Minishant Inn (A77)	Roadside	232983	614277	NO2	N	10	1	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?
DT19	Post Office High St Maybole	Roadside	230110	609984	NO2	N	10	1	N
DT20	Roxy, Bridge St Girvan	Roadside	281549	598064	NO2	N	5	1	N

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
CM1	Roadside	Automatic	89	89	20	23	17	18	16
CM2	Roadside	Automatic	72	72	15	14	9	10	9
DT1	Roadside	Diffusion Tube	100	100	N/A	N/A	9	10	11
DT2	Roadside	Diffusion Tube	100	100	24	25	13	15	14
DT3	Roadside	Diffusion Tube	100	100	N/A	N/A	16	17	18
DT4	Roadside	Diffusion Tube	100	100	15	15	12	13	14
DT5	Roadside	Diffusion Tube	100	100	N/A	N/A	24	29	26
DT6	Roadside	Diffusion Tube	92	92	N/A	N/A	20	22	23
DT7	Roadside	Diffusion Tube	100	100	31	35	26	27	28
DT8	Roadside	Diffusion Tube	100	100	18	22	19	20	20
DT9	Roadside	Diffusion Tube	100	100	N/A	15	19	21	20
DT10	Roadside	Diffusion Tube	100	100	29	31	24	27	26
DT11	Roadside	Diffusion Tube	100	100	29	26	24	25	24
DT12	Roadside	Diffusion Tube	100	100	39	38	31	32	30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT13	Roadside	Diffusion Tube	92	92	33	36	29	29	31
DT14	Roadside	Diffusion Tube	83	83	17	16	15	19	22
DT15	Roadside	Diffusion Tube	92	92	18	20	14	19	17
DT16	Roadside	Diffusion Tube	92	92	29	31	14	17	16
DT17	Urban Background	Diffusion Tube	92	92	4	5	4	3	4
DT18	Roadside	Diffusion Tube	100	100	N/A	N/A	16	21	21
DT19	Roadside	Diffusion Tube	60	60	N/A	N/A	23	23	20
DT20	Roadside	Diffusion Tube	100	100	24	25	24	29	26

Notes: Exceedences of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedence of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2012	2013	2014	2015	2016
CM1	Roadside	Automatic	89	89	0	0	0	0	0
CM2	Roadside	Automatic	72	72	0	0	0	0	0

Notes: Exceedences of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
CM1	Roadside	47	47	13	15	14	15	12
CM2	Roadside	47	47	13	17	13	13	13

Notes: Exceedences of the PM₁₀ annual mean objective of 18µg/m³ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been “annualised” as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

NB Monitoring was changed from PM₁₀ to PM_{2.5} in late September 2016

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM ₁₀ 24-Hour Means > 50µg/m ³ (3)				
				2012	2013	2014	2015	2016
CM1	Roadside	47	47	3	2	0	1	0 (16)
CM2	Roadside	47	47	0	1	0	1	0 (24)

Notes: Exceedences of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 7 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

NB Monitoring was changed from PM10 to PM2.5 in late September 2016

Table A.7 – Annual Mean PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
CM1	Roadside	26	26	N/A	N/A	N/A	N/A	6
CM2	Roadside	24	24	N/A	N/A	N/A	N/A	5

Notes: Exceedences of the PM₁₀ annual mean objective of 10µg/m³ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been “annualised” as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

NB Monitoring was changed from PM10 to PM2.5 in late September 2016

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results for 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (1)
	DT1	8.3	6	14.9	8.1	8.5	7.2	4.7	25.3	12.6	13.7	19.2		
DT2	14.8	11.2	13.5	8.4	11.9	14.3	7.1	15.2	13.2	17.7	23.5	25.6	14.7	14
DT3	17.4	20.7	15	18.2	17.4	19.3	11.8	16.3	16	18.7	22.4	26.3	18.3	18
DT4	8.8	18.7	12.3	13.9	11.3	7.4	4.7	23	11.1	16.1	15.1	25.1	14.0	14
DT5	28.9	27.4	29.2	23.9	31.2	20.1	20.8	2.1	27.3	39.3	37.9	30	26.5	26
DT6	22.2	25.7	22.9	24.9	21.1	17.1	17.9	32.6	21	27.5	25.9	-	23.5	23
DT7	28.5	28.3	31	24.8	23.8	30	20.9	29	26.6	28.9	34.5	44.8	29.2	28
DT8	18	24.4	20.3	18.1	19.8	15.7	13.1	14.4	19.3	22.6	26.3	32.1	20.3	20
DT9	18.3	20.9	21.4	23.5	18.8	19	13.6	13.4	19.5	22.6	21.7	31.4	20.3	20
DT10	22.3	23.1	24.9	32.9	26.9	26.6	16.9	2.1	27.1	29.4	40	47.2	26.6	26
DT11	32.7	27.6	26.1	32.5	22.7	21.3	20.4	2.1	25.9	24.8	28.8	33.8	24.9	24
DT12	30.9	26.3	32.6	34.3	30.8	30.4	16.2	8.5	36	40.6	39	47.6	31.1	30
DT13	28	24.4	25.5	34.4	28.8	32.9	22.1	28.6	41.1	43.4	39.9	-	31.7	31
DT14	16.3	26	-	20.1	13.1	20.1	13.5	32.9	15.9	-	44.9	23.3	22.6	22
DT15	18.3	10.2	15.3	18.6	16.4	16	11	2.1	17	-	40.5	24.2	17.2	17
DT16	1.6	13.1	19.7	16.8	16	19.9	13.9	2.1	17.6	-	40.5	25.3	16.9	16
DT17	4	3.4	5.1	5.8	2.3	2.1	2	9.3	3.6	-	5.4	8	4.6	4
DT18	17.4	12.7	23.6	21.1	21.6	22.8	16.2	12.9	20.1	22.8	28.2	36.9	21.3	21
DT19	23.3	15.4	28.5	23.3	-	-	-	11.7	23.9	5.4	32.4	-	20.5	20
DT20	26.1	16	21.5	31.7	31.6	34.5	25.8	2.1	35.8	30.3	27.5	43.4	27.2	26

(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

Diffusion tubes are supplied and analysed by Glasgow Scientific Services which is operated by Glasgow City Council. The diffusion tube bias adjustment value of 0.97 was obtained from the LAQM Support website at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html> and was applied to all diffusion tubes.

GSS Scored the following results for 2016 in the laboratory summary performance for AIR NO₂ PT: January – February : 75%, April – May: 100%, July – August: 0%, September – October: 100%

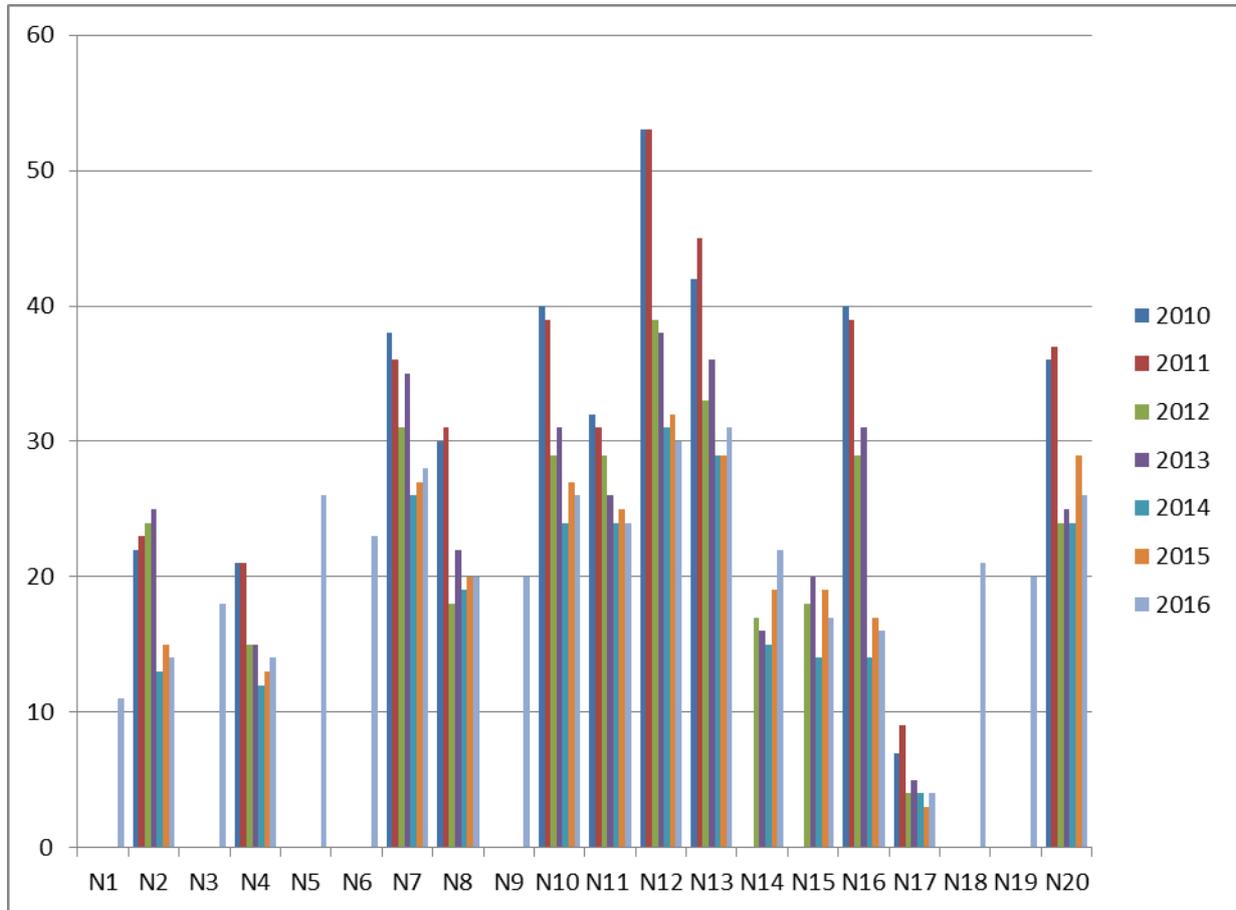
PM Monitoring Adjustment

No correction is required as both monitors are equipped with FDMS.

QA/QC of automatic monitoring

Both sites are part of the Scottish Air Quality Programme and are audited twice per year by Ricardo- AEA. All data is ratified and scaled by Ricardo before being finalised. Servicing and repair is carried out by Air monitors.

Appendix D: Trend of Non Automatic NO₂ Results 2011 - 2016



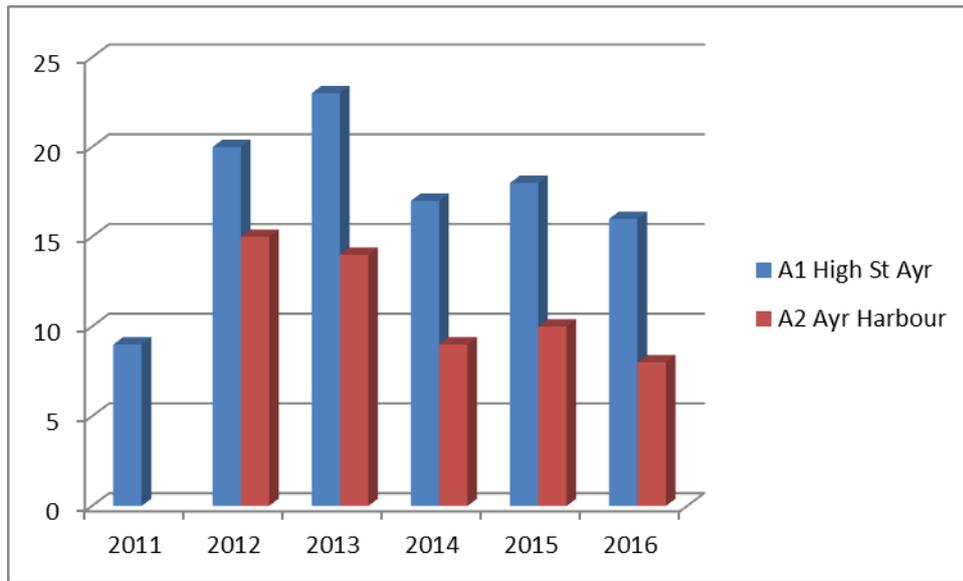
Levels of NO₂ are measured as an annual average and displayed in µg/m³ of air.

In general, there is a gradual downward trend in the NO₂ diffusion tube results with 2011 being the highest recorded year at most sites.

2016 showed a slight decrease at most sites.

Not all sites are displayed in the graph as the location of a number of the lower recording sites have been changed over the seven year period.

Appendix E: Trend of Automatic NO₂ Results 2011 – 2016



Levels of NO₂ are measured as an annual average and displayed in µg/m³ of air.

Monitoring commenced in 2012 at Taylor Street Ayr. This was as a result of complaints from the residents of dust from the adjacent scrap yard.

High Street showed an increase from 2011 to 2013 then a reduction in 2014 and a slight increase in 2015, then a decrease again in 2016. Taylor Street shows a gradual reduction since monitoring commenced in 2013 with a small blip in 2015. The reason for these trends is unclear but all results were well within the limit of 40 µg/m³ of air.

Appendix F: South Ayrshire Council Energy Strategy

SOUTH AYRSHIRE COUNCIL

ENERGY STRATEGY

August 2009

EXECUTIVE SUMMARY

South Ayrshire Council produces more than 25,000 tonnes of carbon dioxide as a result of its energy consumption in its buildings and outside lighting. The Council is committed to reducing these emissions and has signed up to Scotland's Climate Change Declaration, which commits the authority to a series of actions to both mitigate the effects of climate change and adapt to its consequences. The Council has developed a carbon management strategy and implementation plan covering the range of carbon emissions we have influence over. Good practice in energy management in buildings is key to reducing our carbon emissions and as such merits a strategy on its own.

Regulatory measures such as the Carbon Reduction Commitment and the Energy Performance of Buildings Directive are imposing additional pressures the authority to improve energy efficiency. The strategy has within it the following key elements:

- **Roles and Responsibilities** – This covers the active senior management commitment, the specialist energy management group functions, the general responsibilities of all services and also highlighting some of the key services that have a major role to play in implementing best energy management practice.
 - **Monitoring and Reporting** – Effective management requires an understanding of energy performance which in turn requires the availability of good data which must be stored in a system that allows the production of suitable progress reports.
 - **Investment Strategy** – It is proposed the implementation of energy efficiency projects is prioritised by the amount of carbon saved over the life of the measure per £ invested.
 - **Procurement** – The procurement of energy, procurement of energy related services (e.g. PPP schools), energy consuming equipment and procurement of buildings (both new and refurbishment).
 - **Development and Training** – Energy specialists, non-energy specialists with specific energy management responsibilities (e.g. building managers, caretakers etc.) and general training for all staff
- The fundamental premise of the strategy is that energy management is not simply something that the Energy and Resources Group does but it concerns the behaviour

of the whole organisation. This is similar to people management or health and safety management – they are core to all parts of the organisation.

CONTENTS

1. Introduction
2. Energy Policy
3. Roles and Responsibilities
4. Monitoring and Reporting
5. Investment Strategy
6. Procurement
7. Development and Training
8. Maintenance
9. Building Energy Management Systems (BEMS) and Controls
10. Metering
11. Contacts and further information

South Ayrshire Council's estimated energy and water bill for 2008/09 will be over £5 million and we will emit over 25,000 tonnes of carbon dioxide (CO₂) as a consequence. Local authorities have a key role to play in achieving sustainable energy use in Scotland and in reducing CO₂ emissions both from their own activities and those of the communities they serve. The Scottish Government has proposed mandatory long-term target to reduce the country's greenhouse gas emissions by 80 per cent by 2050. Given that buildings account for around 50% of carbon emissions and that around two-thirds of existing buildings will still be in use in 2050, a significant challenge for South Ayrshire Council will be to substantially improve the energy performance of existing stock as well as ensuring that new buildings meet the highest standards. At the same time, regulatory measures such as the Energy Performance of Buildings Directive (EPBD) and the proposed Carbon Reduction Commitment (CRC) will impose additional pressures to improve energy efficiency.

All 32 of Scotland's local authorities are signatories to Scotland's Climate Change Declaration (SCCD), which commits each authority to a series of actions intended to both mitigate the effects of climate change and adapt to its consequences (see box).

Scotland's Climate Change Declaration

Amongst the key points to which Scottish Local Authorities have committed are to:

- Produce and publicly declare a plan, with targets and time-scales, to achieve a significant reduction in greenhouse gas emissions from our own operations. Ensure that greenhouse gas reduction and climate change adaptation measures are clearly incorporated into our new and existing strategies, plans and programmes.
- Publish an annual statement on the monitoring and progress of our climate change response, detailing targets set, actions taken, outcomes achieved and further actions required.
- Collaborate with other organisations to promote good practice on climate change mitigation and adaptation.

Furthermore, the Local Government in Scotland Act 2003 places a duty on local authorities to secure Best Value. This requires all local authorities to continuously improve their performance, secure services of the highest quality at a cost that is acceptable to their local communities, and to discharge their Best Value duties in a way that contributes to the achievement of Sustainable Development.

Best Value and Sustainable Development:

For further information go to:

<http://www.sustainable-scotland.net/bestvalue/index.asp?pg=1>

South Ayrshire Council agreed its Carbon Management Strategy and Implementation Plan in April 2008. It is a systematic approach to address carbon emissions across the activities of energy use in buildings, street and road lighting, fleet and travel on business and for commuting and waste sent to landfill. It uses a strategic approach to embed carbon related issues at a senior level within the authority. It should enable operational and investment decisions to take carbon reduction opportunities into account. Within South Ayrshire Council energy use in council buildings accounts for over one third of carbon emissions. Hence within the Carbon Management approach energy management has a key role in delivery of carbon savings and merits particular attention through a specific energy policy and energy strategy that will complement the wider policies and strategies that address Carbon Management.

Within the context of this document, the term Energy Management refers to the management of energy use in council buildings, but excludes energy efficiency in housing, which is the subject of other policies and strategies. In practice the energy management function incorporates water, and so in this document Energy Management can be read to include management and efficiency of water use.

2 ENERGY POLICY

South Ayrshire Council Energy Management Policy

Statement of commitment by the Corporate Management Team:

The use of energy is vital in our operations and the provision of services to our community.

Rapidly rising energy costs and concerns over climate change mean that the importance of controlling our energy consumption and associated carbon dioxide emissions has never been so high.

The Scottish Government has proposed mandatory long-term target to reduce the country's greenhouse gas emissions by 80 per cent by 2050. As a signatory to the Scottish Climate Change Declaration the Council has demonstrated its commitment to playing its part in mitigating the effects of climate change. Effective energy management is a key part of this commitment and the Corporate Management Team will ensure that:

- energy management is fully integrated across all relevant decision making.
- sufficient resources are in place to meet the objectives of this policy.
- the training and development needs of energy management staff are met and that energy awareness of all staff is raised and maintained.
- this policy document is made public and that progress against its objectives is openly reported on an annual basis.

Scope and objectives

This policy applies to all energy use within Council owned or operated buildings.

The specific objectives of our policy are to:

- reduce the Council's carbon emissions from buildings by 22% over the period 2006 to 2013.
- reduce the Council's carbon emissions from travel by 10% over the period 2006 to 2013.
- reduce the Council's carbon emissions from street lighting by 12% over the period 2006 to 2013.
- ensure that we optimise the Council's position in respect of the Carbon Reduction
- commitment through appropriate early actions and high quality data collection.
- gain accreditation to the Carbon Trust Standard by 2011.

Achieving our objectives

Key to achieving our policy objectives is the development of an Energy Strategy and Associated formal systems. The Energy Strategy sets out the means and processes by which our declared policy objectives will be met and be a regularly reviewed 'living' document.

Policy review

This policy will be reviewed at least every 12 months by the Energy and Resources Group Leader and be revised as directed by the Corporate Management Team.

Approved by

Date

Formal responsibilities for energy management do not reside exclusively with the Energy and Resources Group within the Sustainable Development team of Customer and Community Services. Every member of staff has a duty to be aware of where energy is being used and where there is scope for reducing it through their own actions or with the support of management or the Energy and Resources Group. Management, at all levels, has the responsibility of creating a culture of energy efficient behaviour as well as ensuring there are adequate resources available to meet the desired outcomes of the strategy.

The Chief Executive

The Chief Executive is ultimately accountable for the implementation of the energy policy, energy strategy and other public commitments made by the Council. The Chief Executive therefore has overall responsibility for ensuring that energy management is given the appropriate level of priority within the Council in order that energy policy objectives and commitments can be met.

In addition, the Chief Executive will:

- Provide active and visible support for the implementation of the policy and strategy.
- Ensure that they regularly receive and review appropriate energy performance reports.
- Proactively communicate with elected members on energy performance matters.

The Corporate Management Team (CMT)

All members of the CMT have adopted the carbon reduction targets set in the energy policy for their own directorates and are committed to support the necessary actions to achieve them. Each directorate has at least one nominated member on the Carbon Management Working Group.

Within the CMT the Executive Director for Development and Environment has lead responsibility for the delivery, review and development of the energy strategy. They provide feedback, strategic advice and guidance to the Energy and Resources Group.

Energy and Resources Group (ERG)

The ERG is the core group of staff responsible for the day to day delivery of the energy policy's objectives through the development and implementation of the strategy across the council. The ERG as a whole should encompass the following functions:

- Ongoing monitoring and reporting on energy use, energy cost and related carbon emissions through the use of appropriate energy metering, monitoring and analysis tools and systems.
- Using the same systems, benchmarking of building performance and the identification of exceptions in performance and the instigation of appropriate corrective actions.
- The management of energy supply contracts and connection agreements, in

the context of centralised procurement of energy.

- Validation of suppliers' bills.
- Provision of energy management services, support, training and advice to individual services.
- Identification of opportunities for reducing energy consumption and for using alternative lower carbon sources of energy.
- Maintaining a list of energy saving investment opportunities.
- The driving forward of identified opportunities to implementation.
- Keeping abreast of and managing relevant regulatory or government policy requirements.
- Identification of sources of external funding for energy efficiency investment and support, and ensuring that the Council takes full advantage of such sources as appropriate.
- Specification of energy efficient features in maintenance operations, plant replacements, building refurbishments and in new builds.
- Ongoing liaison as required with other departments in furtherance of the objectives of the energy policy and implementation of the energy strategy.
- Keeping abreast of technical developments that may offer new opportunities for energy/carbon saving.
- Deliver the authority's energy awareness activity – including staff training, web site, Wire and publications.
- Develop the Site Energy Responsible Officer programme.
- Operate an Energy Help Desk.
- To operate the authority's Building Energy Management Systems (BEMS) ensuring that end users requirements are met at lowest energy use/cost.

Although energy procurement is now being carried out by Procurement Scotland the council still needs to provide data for the procurement process and needs to manage the resulting supply contracts and connection agreements. Although these functions should be secondary with respect to energy management they can be very time consuming and significantly distract effort away from the primary energy management functions of reducing energy demand. This is particularly true when transferring supplies at the end of one contract and the start of a new contract and also when suppliers change their billing or data provision systems.

The important thing is that staff within ERG have sufficient time, expertise and resource to discharge their energy management responsibilities effectively which, given the current staffing level of 3 FTE is not possible across the full range of responsibilities listed above.

All Services

Responsibilities for energy management do not reside exclusively with the energy management team. Like safety, energy management is everyone's responsibility. Each of the Council's Services has responsibility to:

- Recognise their role as energy consumers and accept responsibility for their energy performance.
- Manage energy consumption through good housekeeping and investment.
- Make a departmental commitment to energy efficiency.
- Designate energy responsibility to key personnel with one person identified as

the responsible officer for each operational property.

- Promote energy efficiency through their core activity.
- Work proactively with the energy management team, in particular:
- Ensure departmental project teams engage fully regarding proposed projects.
- work with the energy management team to provide relevant information as requested.
- Seek advice from the energy management team.

Asset Management/Property

A definition of Asset Management is “the optimum way of managing (physical) assets to achieve a desired and sustainable outcome” (PAS 551). As such, Asset Management encompasses Facilities, Estates, Maintenance, and Capital Works must:

- Take full account of the opportunities for energy savings that arise out of the rationalisation of the estate or of individual buildings.
- Seek to go beyond legal requirements when designing new buildings, or refurbishing existing buildings.
- Ensure that energy efficiency options are fully appraised on the basis of whole life cycle costing.
- Review options for low carbon/renewable/sustainable energy supplies. Provide practical support to building users to enable them to be energy efficient.
- Opportunistically improve existing assets to improve their energy performance.
- Keep informed of developments in energy efficiency.
- Ensure energy efficiency as a part of all relevant maintenance schedules/procedures.
- Ensure all direct and indirect staff have a relevant competence in energy efficiency.

Finance

- supporting energy management by the provision of timely relevant financial information.
- Identifying where energy management input is required in decision making.
- Involving the energy management team in the development of budgets.
- Providing clear guidance, assistance and support on funding mechanisms.
- Establishing and developing a ring fenced energy investment fund.
- Encouraging the use of life cycle costing.
-

Procurement

- Ensuring energy efficiency is used as procurement criteria where relevant.
- In partnership with the energy management team establishing appropriate procurement/purchasing guidelines and policies that „integrate“ energy into the procurement process.
- Encouraging suppliers to offer energy efficient alternatives/options where available
- Including energy criteria/performance in service contracts.
- Encouraging energy efficiency in the supply chain: i.e. favouring suppliers that

are active themselves in improving their overall energy efficiency.

IT Department

- Considering and responding to the energy demand implications of IT decisions.
- Specifying low energy rated equipment – e.g. Energy Star.
- Publicly Available Standard (PAS) 55, Asset management. *Specification for the optimised management of physical infrastructure assets*. Developed by the Institute of Asset Management and BSI - <http://www.bsi-global.com/en/Shop/Publication-Detail/?pid=000000000030077936>
- Ensuring energy saving features of equipment are understood, enabled and used.
- Supporting specialist IT applications for energy management.
- Involving the energy management team in all projects to ensure energy issues are fully addressed.

Human Resources

- Providing energy awareness as part of induction training for all new staff.
- Support the energy management team in awareness raising campaigns.
- Developing job specifications for the posts in the energy management team.
- Training needs identification.
- Recruiting, training and retaining sufficient staff with appropriate skills to deliver the energy policy and strategy.
- Managing energy training and development as part of individual's overall development.
- Succession planning for key energy posts.
- Including energy performance criteria in job descriptions where relevant.

Janitors/Caretakers/Cleaners/Council Officers

- Being energy aware in their working.
- Reporting issues, failures, incidents that may lead to energy waste.
- Policing shut down procedures.
- Looking for obvious energy waste and reporting it.

Economic development, planning & building control

- Promoting energy efficiency, low carbon energy, sustainable energy where possible through means of regulation, advice and support.
- Showcasing authority achievements.

Effective energy management requires formal systems to be in place for the reporting of progress and performance to a number of stakeholders:

The Corporate Management Team receives quarterly reports on progress in implementing the energy strategy and meeting policy objectives.

The Carbon Management Working Group that meets quarterly will receive reports for monitoring progress. Heads of Service will receive reports regarding the energy performance of their departments and progress on specific initiatives. All staff should be informed about the council's progress and performance.

Reports for external bodies such as the Scottish Government and Audit Scotland Reports for inclusion in external communications such as the Council calendar and Update publication.

These reports are largely be produced by the Energy and Resources Group. As well as providing the mechanism for the ongoing review of progress against the strategy and policy objectives, they also help to maintain ownership of, and engagement with, the recipients of the reports.

The understanding of energy performance and its effective reporting relies on the availability of good data. This requires an effective energy monitoring and targeting system that allows the easy production of suitable reports. Until now the reports have relied on data extracted from suppliers' bills which is inadequate for energy management purposes due to billing errors, estimated reads and the time lag in becoming available. Automatic metering (AMR) systems have developed significantly in recent years and are becoming more and more cost effective where consumption data can be downloaded the following day. The Council has recognised the importance of this good quality timeous data and is investing in the deployment of AMR. One of the "early action" criteria in the proposed Carbon Reduction Commitment, which can help organisations gain an advantageous position in the CRC league table, is the deployment of AMR. Irrespective of AMR, the CRC will put fairly stringent data collection and reporting requirements on local authorities, which need to be addressed. Accurate energy data provision from local authorities is also critical to the success of national procurement of energy in Scotland.

The Council has invested in energy management software to allow automatic monitoring and the production of reports on energy consumption and carbon emissions from an individual property level up to a Service, Directorate or Corporate level. Reports are available to staff over the internet at www.systemslink.com/webreports. Access is arranged through the ERG and can be requested by e-mailing carbonsaving@south-ayrshire.gov.uk. An annual Carbon Management report covering emissions from energy use in buildings, street lighting, travel and waste is publicly available on the Council's website.

The Council has a rolling Central Energy Efficiency Fund of £325,000 for investment in measures with less than a five year payback. Any investment from the fund is paid back out of the annual energy savings until the sum is repaid. This fund was established through funding from the Scottish Government.

Larger projects or those with a payback of longer than five years are generally funded through the Council's capital programme. The Scottish Government recommends under Best Value that whole life cycle costs, including any revenue savings or additional costs, are taken into account when comparing competing demands on capital. It is also recommended that consideration be given to a Council policy incorporating the cost of carbon in investment appraisal once the impending CRC comes into force from 2010.

Competing demands for energy efficiency projects should be ranked according to the

cost per tonne of CO2 saved over the life of the measure.

There are three main aspects of procurement that are relevant to energy management:

Procurement of energy

Procurement of energy related services (e.g.PPPs) and energy consuming equipment Procurement of building design and construction services.

Energy

As a result of the McClelland report energy procurement for the whole of the public sector in Scotland has been centralised. South Ayrshire Council has just signed an agency agreement for Procurement Scotland to procure electricity on our behalf at the end of our current contract from 1st April 2010. It is intended that they will also procure gas on our behalf from this date. It is still the responsibility of the ERG to maintain an accurate database of all the Council's energy supplies across all its operational properties for an effective procurement process and the subsequent management of these contracts during a transfer of supplier, new connections and disconnections and the validation of bills.

Services and Equipment

The energy performance of services and equipment must be taken into account when procurement decisions are made. All staff involved in procurement should be made aware of this requirement and that they can consult with the ERG over purchasing decisions

The Council has a low energy lighting policy of not using standard tungsten bulbs and not installing low frequency fluorescent light fittings. Any lighting procurement should be carried out in consultation with the electrical technician within Property and Neighbourhood Services

Whenever a boiler or heating system is renewed then the feasibility of wood-fuel must be considered.

IT equipment should be selected using energy consumption as a key consideration and any low energy features should be enabled

A print strategy is being developed to reduce the large number of inkjet printers installed and increase the use of multi-functional devices.

It is recommended that the Energy and Resources Group Leader has a formal role in the procurement decision making process for strategic items with sign off requiring the procurement is consistent with the objectives of the Council's energy policy.

Procurement of Buildings

General

The procurement of buildings refers to not only new build projects but refurbishment projects where there is investment in the existing building stock. Please refer to the latest Sustainable Design and Construction guidance (see section 12).

For new build projects the feasibility of achieving an Excellent rating on the Building Research Establishment Environmental Assessment Method (BREEAM) for new build should be carried out with the aim of achieving this standard. The rating should be certified by an independent BREEAM assessor. For major refurbishment or new build projects (e.g. over £250,000 budget) the design team should develop a Sustainability Action Plan in partnership with colleagues from South Ayrshire Council's Sustainable Development section and others which should be reviewed on a regular basis (e.g. monthly meetings) throughout the design and construction phases.

The whole life impact costing of materials and systems should be taken into account. Consider the design for future changes in the building function.

Design & Layout

- Ensure that the design / layout takes cognisance of anticipated climate change impacts e.g. flooding, increased stormy rainfall and that consideration is made with regard to the topography of the site with respect to meteorological effects and energy consumption.
- Where possible ensure new development utilises a brownfield site.
- Give consideration for the development to incorporate Design for Deconstruction and Secured by Design features.
- Give consideration to the incorporation of a green roof in the development – may not only assist in relation to setting this build into the landscape but will assist in water management, biodiversity and insulation of the build.

Waste

- A waste management plan should be developed to minimise the quantities of waste and maximise the amount of waste that is recycled. Provide a monthly report on the quantities of waste produced and amounts recycled for major projects.
- Ensure that the design has factored in external space for accommodating facilities for recycling i.e. segregated waste collection, taking into account H&S and insurance requirements.
- If the development requires any demolition on site that as much as possible is recycled on site and where this is not possible that demolition waste is recycled as far as possible therefore limiting waste to landfill.
- That the internal design considers how segregated waste is dealt with internally e.g. space for bins in class rooms; school office; kitchen Materials
- Ensure timber is from sustainable and legal sources from a Forest Stewardship
- Council (FSC) source. Aim for 100% certification for all timber (including hording) and where possible for finished timber products (e.g. furniture).
- A minimum of 20% of the total value of materials used is to be derived from recycled and reused content in the products and materials selected. In addition identify the top 10 quick win opportunities (for further information see WRAP) to increase the value of the materials derived from recycled and reused content.
- Design to use locally (Ayrshire/Scottish) sourced materials and services wherever reasonably practicable within the financial parameters set.

Energy

- Evaluate the future energy and water costs and carbon emissions for the building and aim to minimise these costs through low carbon design principles.
- In line with the requirements of Scottish Planning Policy 6 (SPP6) at least 15% reduction in CO2 emissions beyond the 2007 building regulations CO2 emissions standard must be met through on-site low or zero carbon equipment for developments over 500m2 floor area.
- Comfort standards – overheating to be limited to 28oC for a maximum of 10 occasions per annum. CO2 levels are not to exceed 1500 ppm at peak and 1000ppm average on peak days.
- All proposed new and replacement heating systems must establish the feasibility of a wood-fuel boiler as the lead boiler (in line with the agreed Council policy). If another fuel source is used then the reasons for this must be documented.
- If gas or oil systems are to be installed then condensing boilers must be used.
- See section 9 for the control of heating and hot water systems.
- Automated meter reading (AMR) meters should be installed as the main utility meters for electricity and gas. Contact the Energy and Resources group for the procedure for installing any new meters or removing existing ones.
- Maximise the use of natural daylight / passive solar gain
- Maximise the use of natural ventilation and cooling systems

Water

- Low water consuming appliances should be considered including waterless urinals, spray percussion taps, low water content dual flush toilets, percussion showers, presence detection flush control for urinals and feasibility of grey water and rainwater recycling.
- Reduce discharge to natural water courses or sewers through Sustainable Urban Drainage (SUDS) principles.
- Prioritise walking, access to public transport and cycling. Provide on-site showers and lockers for cyclists. Provide secure storage for cycles.

There are three categories of staff to consider in the context of energy management training and development:

Energy specialists – i.e. those within the Energy and Resources Group
Non-energy specialists with specific energy management responsibilities.
All other staff

Energy specialists

Increasing energy costs and pressures on organisation to respond to climate change are leading to greater general demand for energy management skills and consequently difficulties in retaining experienced staff. The stability and available skills of energy management teams are key to ensuring that local authorities are able to meet their energy policy objectives.

Staff skills, development and rewards are therefore important factors. Staff grading should properly recognise the qualifications, skills and experience of individuals if stable and effective teams are to be maintained. There should be properly structured and resourced professional development opportunities for energy management staff, including:

- Access to relevant external courses and related qualifications.
- In house training and on the job development.
- Membership of professional bodies and networks.
- The training up of suitable but inexperienced staff as an alternative to recruitment.

Non-energy specialists

Those with specific energy related responsibilities, such as the identified responsible officer for energy for each council property, are likely to require a certain amount of on the job training to ensure that the context and reasons for their energy management duties are appreciated and that they have the knowledge to discharge those duties. This sector also includes janitors and cleaners. There is overlap here with any ongoing general energy awareness and engagement programme (see Other staff below), but specific training will also be important.

Other staff

The behaviour of all staff and users of buildings has an impact on energy performance. An ongoing awareness and engagement programme is in place. All new staff receive training from the ERG covering:

- The environment and climate change
- South Ayrshire Council's targets, commitments and potential for reducing costs
- How individuals can make a difference and what actions they can take
- This is backed up by a section in the employees handbook and available to all staff on the Wire. The Wire section gives clear information on:
 - What individuals can do (and should not do) and why.
 - Mechanisms for staff to input ideas and comments
 - Mechanisms for staff to become more actively involved.

When reactive maintenance is required on building fabric and services then the energy efficiency of the building should be maintained or, preferably, enhanced. For example:

- Controls - if a lighting or heating controller fails then it must be replaced with an equivalent or better controller and not simply bypassed/removed.
- Heating systems - If valves or pumps on LPHW systems are being replaced the connecting pipework and the valves should be insulated. Any short sections of uninsulated pipework identified should be insulated at the same time.
- Lighting – If fluorescent lighting is to be replaced then high frequency fluorescent fittings must be installed (this is a Council agreed policy)
- Loft insulation – If any works require the moving or removal of loft insulation (e.g. plumbing or electrical works) then the loft insulation must be replaced up to a depth of 250mm minimum.

Any new heating controls should be included in the annual planned maintenance arrangements. Heating control systems should have an annual service visit and the time and temperature settings checked against the previously agreed settings for each system. Systems that are not maintained run the risk of heating for longer hours and/or higher temperatures which increases costs and carbon emissions. The systems that control the flushing of urinals should have an annual service to check they are still operational and any problems fixed at the time. The installed cost of one urinal flush controller is generally repaid within 6 months or less. The savings from maintaining these devices in reduced metered water supply and waste water charges far outweigh the cost of an annual service check and repair.

The Council operates a network of building energy management system (BEMS), connected via ethernet communications, to enable remote monitoring and control from Burns House or Newton House. There are currently 20 sites connected to this network with a combined heating and hot water bill of approximately £630,000.

There is currently no capacity within the ERG to regularly monitor the sites connected to the BEMS system and actively control them. It is often the case in organisations that once a BEMS system is installed and commissioned it is not then looked at until a noticeable fault develops. It is estimated that the potential energy savings from actively monitoring and controlling sites through a BEMS system can lead to savings of between 10 and 15% off the heating and hot water bills. It is recommended that the Council invest in recruiting a member of staff to carry out this work.

Any new heating control system on a gas or oil fired system should normally be upgraded to be included on the BEMS network if it is more than a domestic sized system. The control strategy should be demand led so that plant is switched off at periods when there is no requirement for heating, ventilation or cooling.

The installed system should provide:

1. Optimum start/stop of heating (adjustable time settings) based on internal and external air temperatures.
2. Space temperature control of heating pumps and boiler (adjustable set point).
3. Weather compensation control of heating (adjustable slope).
4. Boiler sequencing with automatic boiler sequence control rotation.
5. Pump over-run 5 minutes (adjustable period).
6. 3-Stage frost protection: Pumps operate when outside air temperature is at or below 10C (adjustable set point); Boiler and pumps operate when return water temperature below 50C (adjustable set point); Boiler and pumps operate when inside air temperature below 50C (adjustable set point).
7. Outside air temperature heating hold off at 160C (adjustable set point).
8. Control of DHW storage temperature to 600C (adjustable set point).
9. Time control of primary and secondary DHW pumps (adjustable time settings).
10. Push-button for extending the heating period with on/off monitoring light and cancel facility (adjustable period) suitably labelled.
11. Push-button for extending the DHW with on/off monitoring light and cancel facility (adjustable period) suitably labelled.

For small sites that do not have internet capability and have a wet heating system the minimum control should be time controlled with a seven day timeclock with the facility for programming holidays. These systems should also be fitted with a frost protection facility by either an internal or external tamperproof thermostat to bring the system on at any time. Hot water provision should have its own time control independent from the heating times.

Storage heaters should be weather controlled (e.g. by a Pactrol controller or equivalent) and time controlled with the facility to programme off periods for holidays.

METERING

Any works that require new electricity or gas supplies to be connected or existing supplies to be disconnected must be notified through the ERG. This is necessary to ensure an accurate inventory is maintained for monitoring carbon emissions and ensuring supplies are supplied by the correct utility supplier at the correct contract rates and not a default rate that can be significantly more expensive than contracted rates. Requests for new supplies to be made live should be made to the ERG at least 28 working days in advance of the requirement. The minimum information required with a request is the new supply reference number (MPAN for electricity and MPRN for gas) and an estimate of peak load and annual consumption. Disconnections can take up to 6 weeks to complete.

The Council has a policy of installing Automated Meter Reading (AMR) equipment on electricity supplies where the annual consumption will be greater than 20,000 KWh per annum and 50,000 KWh per annum for gas supplies. AMRs communicate using GSM signals to allow remote reading of consumption data and meter registers. This results in the elimination of estimated reads with the benefit of more accurate bills. It also allows for more accurate and automatic monitoring and reporting of consumption data and carbon emissions. This has increasing importance with greater demands for accurate reporting on internal carbon emission reduction targets and for reporting to external agencies, not least for the Carbon Reduction Commitment which has significant financial implications if accurate data is not available in time and financial incentives for having AMR"s.

Andrew Marnie, Group Leader. 01292 616192 andrew.marnie@south-ayrshire.gov.uk

Bryce Donaldson, Energy Engineer. 01292 616658 bryce.donaldson@south-ayrshire.gov.uk

Brian Edgar, Energy Programme Officer. 01292 616216 brian.edgar@south-ayrshire.gov.uk

Sustainable Design and Construction Guidance. South Ayrshire Council document for clients and construction professionals. Draft available from the Energy and Resources Group.

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

Reference1: Technical guidance LAQM.TG(16), issued by the Scottish Government.

Reference 2: Policy Guidance LAQM PG(S) (16), issued by the Scottish Government

Figure 1: Map showing Location of High Street Ayr Real Time Continuous Monitoring Station



**Figure 2: Map showing Location of Taylor Street, Ayr
Real Time Continuous Monitoring Station**

