



**AC(4)2011(6) Paper 3**

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## **Carbon management strategy update**

### **1.0 Purpose and summary**

1.1 This paper provides the Commission with an opportunity to consider the Carbon Management Strategy agreed in November 2009 by the last Commission. Progress for the second year (2010–11) of the strategy is explained, along with an indication of further action needed over the next three years to achieve the carbon reduction target of 40 per cent.

### **2.0 Recommendations**

2.1 That the Commission:

- a. notes the achievement against our carbon reduction target in Year 2 (2010–11);
- b. considers its future Carbon Management strategy; and
- c. considers, in principle, the work needed to help achieve further carbon reductions.

### **3.0 Strategy**

3.1 In November 2009, the last Commission approved a Carbon Management Strategy and agreed to achieve a Carbon Neutral Assembly by 2015. The principle aims of the strategy are:

- to achieve annual emissions reduction targets of 8 per cent for energy and 3 per cent for business travel (40 per cent overall by 2015); and
- to achieve carbon neutrality by 2015 (focusing on reducing emissions to become carbon minimal and to consider the case for carbon offsetting at the end).

3.2 The new Commission's strategy for the Fourth Assembly includes goals to promote Wales and the work of the Assembly and to use resources

wisely. The 2006 Act requires the Commission to exercise its functions with due regard to the principle of promoting sustainable development. We are recognised as a leading parliamentary body in sustainability terms and the Carbon Management strategy maintains this.

- 3.3 The Assembly is not a full participant in the Carbon Reduction Energy Efficiency Scheme<sup>1</sup> as our carbon footprint for energy is below the current threshold. Over time the scheme threshold will reduce, but as long as we continue to reduce our energy consumption it is likely that we will continue to be exempt. We have registered an 'information disclosure', which includes our energy data under the guidelines of the scheme.
- 3.4 To sustain progress and achieve the goals set in 2009, investment would be needed in Tŷ Hywel, our most carbon hungry building. The paper sets out the progress made to date and the extent of the investment needed to sustain this progress. The Commission will wish to consider its future strategy in this context.

#### **4.0 Progress update**

- 4.1 **Annex A** provides greater detail on progress to date and future actions planned under the strategy. To summarise, in Year 2 (2010–11), we were successful in achieving an 11.1 per cent reduction in energy emissions across the estate. This exceeded our original calculations for annual reduction by 3.1 per cent and equates to a saving of 182 tonnes of carbon and £50,000 in costs.
- 4.2 Similar to Year 1, we have reduced business travel emissions by 18.7 per cent, once again exceeding our original target of 3 per cent per year. This reduction equates to a saving of 40 tonnes of carbon and cost savings of £61,000 over the previous year. However, it is possible that as we progress through the Fourth Assembly, there may be an increase in business travel, consistent with the new Commission's strategic goal to promote Wales in the wider world.
- 4.3 Overall, we have achieved emission reductions of 19 per cent to date against a target of 40 per cent by 2015 equating to a carbon saving of 465 tonnes.

#### **5.0 Looking ahead**

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<sup>1</sup> A mandatory UK scheme for energy efficiency which applies to large public and private sector organisations.

- 5.1 Whilst progress to date has been very good, we have achieved this through limited investment and relatively straightforward actions. We will need to take significant steps in order to maintain progress and to achieve the targets set by the last Commission. In particular, further adaptations to Tŷ Hywel will be necessary. The long-term improvement of Tŷ Hywel's performance can only be achieved through investment in proven technology, which will help us achieve our targets and reduces our vulnerability to rising energy costs.
- 5.2 The current method of cooling Tŷ Hywel through use of air conditioning is the most carbon hungry part of the building's operation. Air conditioning could be replaced, in whole or in part, by replacing existing windows with better designed and part-automated models, which will support efficient natural ventilation. Cost estimates for such work have been developed from professionally executed feasibility studies with the support of the Carbon Trust and Arup Ltd. The costs are significant – approaching £4m to replace all the windows in Tŷ Hywel – although the existing windows will need replacing within the next ten years or so in any event as part of our responsibilities for building maintenance at an estimated cost of £1.7m.
- 5.3 Based solely on estimated savings from current energy costs, and not taking into account the need to replace the windows in any event, this investment would be repaid in 19 years. If energy costs increase, the payback period will reduce. Taking into account the need to replace the windows in any event, the additional costs of the naturally ventilated option would reduce to a payback period of 16 years. If we also apply a 5 per cent energy costs inflation level, this further reduces the payback period to 12 years. The Assembly would saving an estimated 800 tonnes of carbon emissions in relation to current emission levels and predicted emission levels following the completion of the investment and would maintain this reduced level of emissions for future years. This would also reduce or remove the need to undertake carbon offsetting, which also carries a cost.
- 5.4 In order to assess the benefits of such an approach, we could pilot the part-automated windows in a suitable area of Tŷ Hywel for a year. This would require an estimated initial investment of £0.4m. Subject to the outcome of the pilot, further replacements through the building could be phased over a five-year period, forming part of our annual investment programme.

## 6.0 Conclusion

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6.1 The Carbon Management strategy is proving extremely valuable in driving sustainable development and reducing the impact of the Assembly's activities on the environment. Progress in the second year is very good and builds on the success of the first year to provide a strong platform for future reductions. However, in view of the scale of future steps needed to deliver the strategy, it is right that the new Commission reviews these commitments.

## 1.0 Carbon Management strategy – Progress to date

1.1 In 2008–09 the Assembly’s carbon footprint was 2,890 tonnes of CO<sub>2</sub>. Most of this comes from two main sources:

- i) energy consumption from the Assembly’s buildings; and
- ii) business travel (whilst at work).

1.2 The Carbon Management Plan sets a 40 per cent reduction target in CO<sub>2</sub> emissions to be achieved by 2015. The plan to deliver the Carbon Reduction Strategy included a schedule of projects which had the potential to produce a 380 tonne reduction in carbon emissions over the duration of the programme.

*Table 1.0 Progress to date against these projects*

<b>Details of selected package of works</b>	<b>Progress to date</b>
Current model of existing building to assess feasibility of natural ventilation options	Feasibility studies and tests on the building have revealed that it can be successfully returned to natural ventilation.
Movement sensor lighting throughout	The on-going programme to install PIR lighting throughout the office continues to be rolled out subject to budget availability. There are approximately 500 lights remaining in Tŷ Hywel.
PIR sensors to meeting rooms, air conditioning and car park lighting.	<p>PIR sensors have been installed to conference and meeting rooms with standalone air conditioning units. Therefore, these units will automatically switch off when these rooms are vacant.</p> <p>PIR sensors have also been linked to the underground car park lighting to enable these lights to be switched off when no one is present in the underground car park.</p>

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<b>Details of selected package of works</b>	<b>Progress to date</b>
T5 fittings (replacing existing T8s)	Installed throughout the building.
LED car park lighting	External car park lighting replaced for more energy efficient LED lights.
Point of use electric domestic hot water	These are installed to all staff kitchens and tea points as well as timer switches so that these are switched off during out of hours periods.
Mechanical vent improvements	See below variable speed drives
Improve heat recovery	Adjustments have been made to B block air handling unit to improve heat recovery in this area.
Variable speed pumps/fans	Variable speed drives have been installed to all fans and pumps to improve the energy efficiency of heating and cooling systems.
Wall and roof insulation (to regulations)	On-going longer term strategy
Improve boiler and chiller efficiency	Two of the three chillers have been replaced with more energy efficient models. Boiler replacement is part of the longer term strategy.
Improve infiltration	High efficiency air filters have been deployed on air handing units to improve air flow. Filters are replaced periodically as required.
Mixed mode ventilation strategy	A full specification and costs have been prepared together with a detailed plan of the proposed works for the trial elevation on the first floor of Tŷ Hywel. This area will be used as a pilot for the scheme to determine if the underlying principles of

<b>Details of selected package of works</b>	<b>Progress to date</b>
	natural ventilation can be realised.
Fully naturally ventilated	On-going longer term proposed strategy

1.3 In Year 2, an additional action plan was developed and progress against these actions are outlined below.

*Table 2.0 Progress to date against the key actions identified in Year 2*

<b>Details of selected actions</b>	<b>Progress to date</b>
Assess efficiencies from auto shutdown of new ICT equipment	Currently underway and when complete results will be published.
Improve occupant behaviour through targeted environmental communications	Part of the strategy for improving data collation and analysis techniques to enable regular performance reporting.
Publish performance data monthly to encourage ownership of energy consumption	See above.
Review of server farm set points	Server farm set points have been reviewed to improve energy efficiency and reduce cooling.
Assess feasibility of free cooling for Tŷ Hywel server farm in winter months.	This has been successfully implemented using cold air from the underground car park to cool the server room on the ground floor. The air is cold enough to use for most of the year.

1.4 We also stated that we would achieve the remaining 380t reduction through the Green Dragon Environmental Management System. This continues to be highly effective in driving cultural change, improving buy-in and changing hearts and minds.

1.5 Reductions in energy consumption and increasing sustainable choices in business travel are the clearest indicators that sustainability is starting to embed in everyday business. However, the bigger challenges such as working in naturally ventilated spaces, an increase in homeworking and seasonal "mothballing" of parts of the building will require even greater acceptance of change.

1.6 The table below summarises how progress against these actions has reduced CO2 emissions and resulted in cost savings.

*Table 1.1 Carbon and Cost Savings*

	<b>Energy (tCO2e)<sup>2</sup></b>	<b>Business Travel (tCO2e)*</b>	<b>Total</b>
2008-09 (baseline year)	2,653	237	2,890
2009/10 (year 1)	2,441	194	2,635
Carbon Saving (tCO2e)	212	43	255
Cost Saving (£)	£50,000	£150,000 <sup>3</sup>	£200,000
<b>2010/11 (Year 2)</b>	2,188	154	2,342
<b>Carbon Saving (tCO2e)</b> (on previous year)	253	40	293
<b>Cost Saving (£)</b> (on previous year)	£50,000	£61,250 <sup>2</sup>	£111,250

### Looking ahead – Year 3

1.7 The focus for Year 3 of the strategy will be centred around the natural ventilation trial in the first floor of Tŷ Hywel, supported by a targeted communication programme to inform, involve and engage occupants in

<sup>2</sup> In the period between calculating the Assembly's carbon footprint through the Carbon Management Plan and the present year, Groundwork Wales – the organisation responsible for administering the Green Dragon Environmental System have decided to adopt Defra's conversion factors for greenhouse gas reporting as they are updated annually. This has resulted in the recalculation of the figures in the baseline year (2008-09) which has resulted in an overall increase in the Assembly's emissions for energy and a reduction in the emissions for travel. This has not significantly changed the overall carbon footprint.

<sup>3</sup> Although the carbon saving is approximately the same over the two years, the significant cost saving in year one resulted from a sharp drop in air travel whereas in year two carbon savings were realised through reductions in car use only thereby resulting in reduced cost savings.



the project. This will be supplemented by the continued programme of building improvements and strategic energy management to identify further opportunities for energy reduction.

- 1.8 A key challenge for the Assembly and specifically those occupants in the trial area will be to understand, support and embrace the transition to natural ventilation with a willingness to work flexibly if required whilst the necessary building works are carried out. To offer the greatest chance of a positive outcome, we need to ensure that resources are available to fund and support this significant investment for long term gain.
- 1.9 The Green Dragon action plan for 2011–12 which supports the strategy has recently been reviewed by the Clear Skies Group as part of the Green Dragon annual management review. Progress has been noted and actions identified to help achieve the 8 per cent reduction target in the third year. The delivery of the action plan will continue to be monitored throughout the year.
- 1.10 This works in tandem with the proposed package of works for improving the building management system in year 3 which are as follows:

*Action Plan – Year 3*

<b>Details of selected actions</b>
Commission the trial of natural ventilation in the first floor elevation of Tŷ Hywel
Continue roll out of PIRs across Tŷ Hywel
Develop a focussed, integrated approach to energy management and carbon reduction
Carry out base load assessment of Senedd IT and electronic equipment to identify opportunities for energy reduction
Use the Senedd Refresh Project as an opportunity to identify further sustainability improvements
Improve occupant behaviour through targeted environmental communications
Publish performance data monthly to encourage ownership of

<b>Details of selected actions</b>
sustainability programme.
Undertake further trials with Solaveil film on areas with high solar gain.
Assess the feasibility of channelling excess grey water into Tŷ Hywel from the Senedd for toilet flushing purposes.
Upgrade and/or replace the building management system as part of the new FM contract.
Investigate feasibility for installing solar PV panels on the Senedd roof to provide renewable electricity.
Keep abreast of new and developing technological advancements to identify opportunities for improving sustainable performance.

1.11 The actions outlined above will lead to further financial savings and a reduction in carbon emissions. It should be noted that currently, financial savings realised are not ring fenced and re-invested into further sustainability initiatives and maybe this is something that could be considered going forwards.

## **2.0 Offsetting**

2.1 We stated in the Carbon Management strategy that our focus to 2015 will be on reduction only. In accordance with this, we have not offset any emissions In Year 2. Although we proposed to offset the emissions from air travel and Members' private car use immediately, this has not been needed as a result of the continued drop in business travel.

2.2 However, recognising the importance of the new strategic goal to 'Promote Wales', and in consideration of the potential impact this may have on travel, we will monitor and encourage sustainable travel choices where possible to reduce the likelihood of introducing offsetting.

2.3 If we choose to adopt offsetting in Year 3, the financial resources required will be drafted into the budget.