

UK MINERALS FORUM

CARBON AND PROXIMITY IN MINERALS WORKING GROUP

REPORT ON THE WORK PROGRAMME ON 2007-2008 FOR “LIVING WITH MINERALS 3”

Introduction

1. It was decided at the UKMF meeting in September 2007 to establish a Working Group to examine and report on the issue of carbon and proximity in minerals supply as one of the 4 detailed themes of the Living with Minerals 3 (LWM3) Conference in November 2008.

2. The Group (Working Group 3) was given the following remit:

Climate change policy demands that we move towards a low carbon economy.

What are the implications for future mineral supplies? How can we best estimate and compare the alternative options for supply and what other issues would need to be taken into account in balancing carbon objectives against other aims of Government?

The Working Group should focus upon these issues only from the point of extraction to the first point of customer delivery i.e. from mine, quarry, wharf and depot to the first external customer and not become enmeshed in downstream manufacture and processing e.g. cement production, coal burning, rmx concrete etc.

3. The Group met 4 times, in December 2007 and in March, June and August 2008. It comprised a core membership attending meetings and a broader “corresponding group” that saw papers and commented as necessary by e-mail. The core membership included representatives of the aggregates, coal and cement sub-sectors of the minerals industries, the Minerals Association of the UK (for some of the specialist sub-sectors), local government planners, minerals consultancy, and the British Geological Survey (BGS). Along with BGS, the Quarry Products Association provided valuable support on data and analysis, and hosted the Group’s meetings.

4. The Corresponding Group consisted of contact points in the other main trade associations representing the UK’s mineral industry sub-sectors, the government departments with a major interest (DBERR (since June 2009 DBIS), Defra and DCLG), the UK’s devolved administrations in Scotland, Wales and Northern Ireland, the main UK environmental NGOs (via the Wildlife and Countryside LINK), the UKMF Secretariat and the CBI Minerals Group.

Scoping the work

5. The Group confirmed UKMF’s view that the biggest carbon emission and reduction issues in the UK’s onshore mineral production and use arise not from extraction and initial

transport but in downstream processing of mineral products. Some of this is very energy intensive. That is why cement, brick and gypsum production, together with china clay and potash extraction, are already covered by formal carbon reduction measures such as the EU's Emissions Trading Scheme and the UK's Climate Change Agreements.

6. In line with its remit, Working Group 3 therefore concentrated on carbon and proximity issues from the point of extraction to delivery to first customer. In the case of minerals where processing is covered by Climate Change Agreements the Group looked only at the movement of materials (including soils and overburden) upstream of application of the CCA – normally entry of material into the primary crusher or equivalent. However, it also looked at downstream processing of aggregates into asphalt and ready-mix concrete, since these activities are closely integrated with quarrying and are not yet covered by statutory carbon reduction arrangements. In addition, it looked at the carbon impact of importing minerals where these are in competition with primary UK production, actual or potential. It did not, however, measure the carbon footprint of moving within the UK imported manufactured mineral products such as cement or fertiliser, or the transport of imported minerals not in competition with UK sources, such as iron and other metal ores. The Group's remit did not extend to the UK's offshore production of oil and gas, and this was not examined.

The Group's findings – setting minerals carbon in its wider context

7. Overall, the carbon produced by extracting and transporting land-won minerals in the UK outside the present statutory schemes is not particularly large when compared to other carbon generators in the economy and society. Collated statistics for the minerals industries were not available, but work by the Group estimated that the annual production of CO₂ in the UK's minerals activity it examined is of the order of 4 million tonnes per annum, of which 1.29 million tonnes (about 32.2%) is from off-site transport and moving coal imports that compete with UK production.

8. The detailed estimates are in the tables in the Annex. Extraction emissions are set out in the first table, transport emissions in the second. While these figures are a useful broad estimate, they are likely to under-estimate the full carbon footprint of mineral extraction, initial processing and transport. Further work remains to be done; these figures represent "work in progress". It is the best information that was available to the Group or obtainable with the resources available to it. In the first table, the scope of the Kg/CO₂ per tonne has not been fully validated in all source data received by the QPA (since June 2009 MPA) for aggregates, and equivalent data for other minerals is very limited. Extrapolating from aggregates data should as soon as practicable be replaced by validated mineral-specific assessments. Further work is needed to check whether non-extraction omissions on mineral sites (for example the carbon released from generating the energy used in water and liquid waste pumping, crushing and screening, site lighting, offices and workshops, wheel and road washing) have been properly assessed. In the transport table, it remains to include the (much smaller) flows of mineral imports other than coal that are supplementing UK resources.

9. To put these estimates in perspective, economic and social activity in the UK in 2006 is estimated by Defra to have produced the following emissions:

Million		tonnes CO ₂
Energy generation	232	
Transport	130	
Industry		93
Domestic energy use		76
Commerce and the Public Sector		23

10. For more perspective, livestock digestion and manure management in UK agriculture in 2006 is estimated to have produced about 890,000 tonnes of methane. Its much higher power as a greenhouse gas means this is equivalent in climate warming terms to nearly 19 million tonnes of CO₂. Landfill of biodegradable waste is estimated to have produced a similar amount, though this is increasingly captured and either flared to reduce the methane to “less harmful” CO₂ or, preferably, used to generate electricity.

11. But none of this lets the non carbon-regulated minerals industries off the hook. National climate change policy demands that we move to a low-carbon economy. Since the Group began its work, the Government announced in September 2008 that it was committing the UK to a cut in its greenhouse gas emissions by 80% below 1990 levels by 2050. At the end of November 2008 the Climate Change Act came into force, enshrining this commitment as a ministerial duty in Section 1, and giving the government power to set intended and intermediate statutory national carbon reduction budgets, the first 3 of which are proposed to be set alongside the fiscal budget in 2009.

12. So the Group recognised that wherever carbon gases are produced in the minerals extraction and transport processes action has to be taken, in line with the reality already recognised by UKMF in 2007 in setting carbon as one of the 4 themes for LWM3.

The Group’s overall approach

13. The Group decided early on to focus on how best collective voluntary action by the minerals industries to improve their carbon performance could be supported and promoted. This was based on two judgments.

14. First, the Group felt overall that the extension of statutory carbon reduction measures, for example in cap and trade schemes, would not suit the wide diversity of activity, scale and corporate structures in the minerals industries not at present subject to carbon controls. It would be bureaucratic, encouraging routine compliance rather than initiative and innovation. Depending on how the scope of schemes are designed (for example in the case of the proposed Carbon Reduction Commitments, based on bulk electricity use at the broadest level of UK corporate structures to which operating units belong) it could lead to distortions of competitiveness between companies because of their organisational parenthood, not their energy efficiency.

15. Second, the Group noted a lot of highly relevant general material was already available, and that a wide range of good practice is already in use across the minerals sectors. Carbon reduction in minerals extraction and transport is not rocket science. A lot of

good work is being done, but evidence on company commitment, take-up and monitoring progress seems to be patchy. The rest need to be brought up to the level of the best.

16. The Group found 3 powerful practical tools were already available or developed during its work that, if they had not already existed, it would have recommended should be developed:

- *the 2002 Guide for managers in the extractive industries on Fuel, Power and Water from the Energy Efficiency Best Practice Programme;*
- *the 2008 Carbon Management Good Practice Guide from the Quarry Products Association;*
- *a “carbon footprinting” model for aggregates developed for WRAP (the Waste and Resources Action Programme) by Imperial College under MIRO sponsorship (technically an Aggregates Life Cycle Inventory and Assessment Model).*

17. The Group’s work also paralleled the development, and recently the completion, by the British Standards Institution, in partnership with the Carbon Trust and with Defra sponsorship, of a hybrid life cycle analysis (LCA) framework known as PAS (Publicly Available Standard) 2050. This is a procedural framework, building on earlier quality control protocols such as in the ISO 14000 series, for carbon footprinting methodologies. When the Group looked at PAS2050 in spring 2008 it did not see sufficient direct relevance to carbon footprinting in the minerals sector to identify it as a tool of immediate significant usefulness in reducing “minerals carbon”. However, the emergence of statutory government carbon reduction targets and the recent completion of PAS2050 with clear government support suggest that future work of carbon footprinting in the minerals industries will need to pay regard to its principles and protocols. Purchasers of mineral products will increasingly want assessments of embodied mineral carbon that are compatible in terms of method and reported units with other components in their carbon reporting and product marketing.

18. Alongside these tools, and the emergence of PAS2050, the Group found there is already a wealth of site-based examples in energy management in the extraction, processing and movement of material, including action on energy monitoring, audit of motor ratings, pumping, conveyors, and fuel-efficient driver training. However, it identified a need to spread awareness, broaden company commitment and ensure action is followed through across the whole of the UK minerals sector.

Transport and proximity

19. Transporting minerals from source to users is clearly carbon-intensive. As noted above, the Group estimated that haulage accounts for just over 32% of the embodied carbon in the extraction and initial movement to first point of UK land-won minerals, and coal imports (the main import in competition with domestic mineral production). How could mineral transport distances best be reduced? On the issues of proximity the Group took a two-tier approach.

20. Of the minerals extracted and used in the UK, aggregates are by far the largest by tonnage. They are widely used and, despite supply constraints in some areas, still pretty widely available. Imports from outside the UK are still very limited – aggregates are truly the last “local mineral”. Tougher planning policies could require preference for local sources, to cut down average haulage distances. Is this practical or realistic? For other minerals extracted and used in the UK there is usually less flexibility over transport options. Viable sources of economic quality and quantity are usually very constrained in number and extent, and may now bear little or no relation to the location of downstream processing facilities or markets. While minimising haulage distances and costs is desirable in itself, and may be driven by business pressures, it may not be practicable for wider reasons to locate processing closer to mineral sources. And cutting the initial transport distance may simply add distance to the movement of products to market after processing.

21. For those minerals imported to supplement UK land-won sources, the Group felt the question was whether there should be some form of intervention to give preference or added weight to those local sources in regulatory decisions on account of the lower transport distances to UK users. In terms of tonnage, the main mineral import areas for attention would be coal and, potentially, cement (if comparisons with processed or semi-processed materials were to be considered as well as with raw minerals).

The Group’s conclusions – issues presented to LWM3

22. Giving greater or even overriding weight to carbon reduction in the location and use of UK-won mineral resources raises the wider question of how carbon reduction is factored into regulatory decisions alongside more traditional environmental factors in the overall judgment of “sustainability”. Carbon reduction is a latecomer against the other environmental issues the minerals industries have had to come to terms with over the past 40+ years. Does carbon now trump those issues and factors, or should it be added to the rest of the “environmental pot”? What is the regulatory signal to which the minerals industries should respond by means the Group’s preference for voluntary action in cutting energy use and carbon emissions?

23. Drawing all these threads together, the Group considered that the UK’s minerals industries should develop for itself a convincing response on carbon through effective voluntary action. But for its preference for a voluntary approach to be realistic it would need to be backed up by co-ordinated activity across the minerals sector as a whole, rather than leaving it all to individual companies and individuals at site level. The Group therefore proposes that voluntary action by the minerals sector should be boosted by collective co-ordinating action. It is however for further consideration whether and how this could be achieved. Could it be led or sponsored by a team working for UKMF, or would CBIMG be more appropriate? How can effective responses across all minerals sub-sectors and from all companies be achieved? Can a credible delivery mechanism be created, not least at a time of deepening recession when company survival is becoming a boardroom priority, especially for those producing construction minerals?

24. The following questions on carbon and proximity in minerals supply were prepared for the voting session of LWM3 on 3rd November by the Conference Facilitators on the basis of

proposals put forward by the Group that reflected its conclusions. The percentages after the questions are the responses from those voting at LWM3. The messages these convey are discussed below.

Question 1:

How should the industry's carbon reduction progress be benchmarked and measured?

1. *Rely on the new Climate Change Department? (13%)*
2. *Continue with the industry's own informal estimates? (5%)*
3. *Establish new industry-led assessment of all UK mineral operators & importers? (77%)*
4. *Some other way? (5%)*

Question 2:

How can the good practice in carbon reduction and greater energy efficiency already applied by the best in the industry become the norm?

1. *More persuasive government incentives? (12%)*
2. *Stronger statutory regulation? (9%)*
3. *A combination of 1 and 2? (37%)*
4. *Let company bottom lines drive improvements? (7%)*
5. *Industry action to secure industry commitment? (33%)*
6. *Some other way? (2%)*

Question 3:

How can we best achieve carbon reduction in the transport of aggregates?

1. *Adopt planning policies that explicitly favour local sources – to reduce transport carbon? (28%)*
2. *Maintain current position, balancing proximity with other factors – such as environmental and material quality? (63%)*
3. *Some other way? (9%)*

Question 4:

How can we best reduce transport carbon when considering UK land-won minerals that are also available as imports?

1. *Adopt planning policies explicitly favouring use of UK sources over imports? (29%)*
2. *Maintain policy currently followed in England favouring UK sources wherever practicable, but still subject to market factors? (66%)*
3. *Some other way? (5%)*

Question 5:

How can government, regulators and the minerals industry best work together to reduce the industry's carbon emissions?

1. *Government & regulators take lead on best approach – industry responds? (5%)*
2. *Government makes carbon/energy reduction overriding consideration in all regulatory decisions? (14%)*
3. *Government continues to balance to carbon reduction with other environmental factors and relevant considerations? (42%)*
4. *Industry leads by establishing a sector-wide approach on carbon? (35%)*
5. *Some other way? (4%)*

Implications of the LWM3 voting responses

25. As noted at the UKMF meeting on 2nd December, caution is needed in interpreting the voting results at LWM3 in view of the pattern of representation. This was:

1. *Government departments 6%*
2. *Government agencies 5%*
3. *Regional organisations 3%*
4. *Local authorities 13%*
5. *NGOs 4%*
6. *Industry 32%*
7. *Consultant/lawyer/professional 31%*
8. *Media 3%*
9. *Other 3%*

26. Attendance was self-selected. The predominant voting opinion (over 60%) was therefore from the minerals industries and professionals working in the minerals planning and development process. The latter might be assumed overall to incline towards the industry's point of view. Bearing in mind that possible effect on the opinions of those voting, the Group's initial assessment of the voting results is as follows:

Question 1: LWM3 opinion supported the Group's view that the minerals industries collectively should take a lead in developing a baseline of its carbon emissions footprint on a common basis, and then measuring progress in reductions against it.

Question 2: The Group's preference for industry-led voluntary action would have been endorsed had majority LWM3 opinion gone for option 5 (Industry action to secure industry commitment). Though a third of delegates supported this, the clear majority actually went either for more government incentives (12%), stronger regulation (9%) or a combination of the two (37%) – 58% in total. This outcome will need further thought.

It looks primarily to the government for action, and at present, following the recent completion of the Climate Change Act, the next phase could involve Carbon Reduction Commitments. While it remains unclear exactly where CRCs would apply to emissions from mineral working, as noted in paragraph 14 above, industry representatives on the Group had strong reservations generally about whether further cap and trade schemes were the right way forward, given the diverse pattern of size and corporate structures in the minerals industries. But would any statutory scheme tailored to the particular needs of minerals extraction and transport likely to be a priority for the Government given the comparatively small carbon footprint relative to other parts of the economy?

Question 3: On this first of the questions about minerals transport, LWM3 delegates had an opportunity to support the principle of reinforcing the case for new or extended aggregate quarrying sites to serve local needs, by substantially increasing the weight given to reducing overall haulage distances to users and markets. This could have favoured smaller regional and local operators. However, delegates decisively (63% to 37%) favoured maintaining the present planning position, in which transport and proximity are weighed against other relevant environmental considerations in reaching decisions. This suggests that pressing for explicit changes to planning policy should not be a leading objective at present. However, the Group considers that increasing pressure to reduce carbon emissions as the Government's framework of statutory targets starts to bite will itself add weight to proximity arguments in planning decisions.

Question 4: LWM3 delegates took a similar position on the transporting of imported minerals in competition with UK land-won sources, supporting by a slightly larger majority (66% to 34%) present English planning policy, which favours domestic resources to avoid exporting environmental damage, while recognising the primary role that market conditions play.

Question 5: The responses of LWM3 delegates to this final "overview" question on the future approach to carbon reduction in minerals extraction, initial processing and transport confirms their views on the earlier questions. By 42% to 14%, delegates thought the Government should not make carbon reduction an overriding consideration in decisions about minerals (i.e. primarily in planning decisions). A further 5% favoured Government-led regulation to encourage carbon reductions. But a substantial minority (35%) also backed the Group's preference for industry-led, industry-wide voluntary action, in line with the 33% supporting industry-led action to extend and reinforce existing good carbon practice in reply to Question 2. To some extent, this question did not pose mutually-exclusive alternatives, and the answer seems to reflect relative preferences rather than absolute and opposing views.

Overall conclusions

27. How these voting opinions should be taken forward is a matter to be considered by UKMF. As an input to that discussion, the Group considers the following is the best overall assessment of what came out of LWM3:

1. there is strong support for the minerals industries collectively developing a baseline of its carbon emissions footprint on a common basis, and then measuring progress in reductions against it;
2. as regards addressing the issue of embodied transport carbon in UK minerals, there is clear support, by around 2:1, in favour of maintaining the present planning policies on the location of UK mineral workings, and on using domestic rather than imported materials. These are based on a balance of planning considerations rather than a weighting expressly in favour of proximity to reduce transport carbon;
3. about a third of delegates appear to give general support to industry-led voluntary action to cut embodied carbon in minerals, though when asked about the best approach to embedding good practice a clear majority (58%) preferred either government regulation or better incentives, or both. The delegates from industry and the private sector professionals that predominated at LWM3 did not signal the same measure of support for collective voluntary industry action as did the Group itself, though their support was still significant. This might pose difficulties in getting effective industry-led action off the ground, especially at a time when the impacts of recession are placing severe demands on company attention, resources and priorities. While, as noted above, there are plenty of examples of available good practice and technology that can produce win-win solutions, there would still be the need to devise a credible framework of collective voluntary action if the government is to be persuaded the industry can deliver without being subject to statutory action. Alongside inevitable pleas for exemptions from other sectors, the case for a voluntary approach in minerals would have to be exceptionally compelling.
4. In view of the substantial preponderance of aggregates by weight in the total of minerals raised in the UK, might there be a case for seeking support from the Aggregates Levy Sustainability Fund for further work in this important area? Even allowing for the current recession, it is probable there are emissions in excess of 4 million tonnes of CO₂ to be tackled.

19th June 2009

[Carbon Matrix Summary Report](#) (click to download).