Green carbon – a natural response

No one seriously expects the fossil fuel age to end soon. It will certainly take decades for non-carbon based sources of energy to make a significant contribution to the energy equation. The capital cost of such a transition is estimated by the International Energy Agency at $10tn and the time needed for technological advances and commercialisation is measured in decades. Yet no one seriously believes that the fossil fuel age will last forever. Carbon constraints, in the form of emissions caps, fees or taxes, may have been delayed by the recession but the momentum behind them will not abate. In these circumstances, how does the oil and gas industry adapt at the lowest possible cost? Eric Bettelheim *and* Michael Mainelli *explain.*

In the long term, investments in renewable energy may well pay off handsomely and several of the oil majors have made bets on various approaches including next-generation biofuels. In the medium term, however, what has been striking – particularly for a carbon-based industry – is the lack of interest in the largest and lowest-cost method of dealing with emissions reductions, namely photosynthesis.

According to McKinsey & Company, over 40% of the emissions reductions that can be achieved over the coming decades are from changes in forest and agricultural use. Deforestation alone accounts for 17% of global carbon emissions – more than the entire transportation sector, which accounts for 14%.

Unlike technological fixes, capturing carbon in plants and trees is available now at scale and at low cost. The cost of carbon offsets from tropical forest activities varies from €2–€15/t of carbon dioxide equivalent (CO_2e); an order of magnitude less expensive than other offsets such as land-fill and methane recapture. The efficiency of Mother Nature's carbon capture and storage is unlikely to be equalled by mankind anytime soon. Carbon storage by photosynthesis is not only available at scale (hundreds of millions of tonnes can be captured and stored in a single project area) and in a wide variety of locations at low cost, it is also highly predictable and readily measurable.

Trees grow and retain carbon over precise time scales and in precisely measurable amounts and can thus be easily matched to a company's emissions profile. In this way, the full cradle-to-grave emissions profile of a refinery or the predicted annual production of fossil fuels of a company can be matched to forest projects whose lifespan is similarly measured in decades. This also allows flexibility as plans change because additional capacity can be easily added or excess capacity sold or banked for the future. Although it may not be intuitively obvious, the project design and implementation and duration of return on a forest carbon project closely parallels that of an oil or gas field development or a refinery development. The major difference is the low capital cost of forest projects which require minimal infrastructure.

The acceptability of forest and agricultural carbon in the world's emerging emissions markets and regulatory systems has been slow to develop but it is now widely recognised that it will be essential to meeting emissions reductions goals at reasonable cost. The pending US legislation expects to import one billion tonnes of carbon credits every year and most of that must come from tropical forest projects as there is no other potential high volume source in the foreseeable future. It is also no mistake that forest carbon is included in the draft legislation under the section headed 'cost control' as it is by far the lowest cost source of offsets. The trading and regulatory systems emerging in Japan, Australia and China will all include such offsets as, eventually, will the European Union's Emissions Trading Scheme – with or without an internationally binding agreement. The billions of dollars now being committed by governments such as Norway, Germany and France, to reducing emissions from deforestation is an indication of where things are headed.

Growing new carbon to offset the emissions of burning old carbon has a pleasing symmetry and comes with considerable corporate social responsibility benefits as well. Most oil and gas companies face the problems of the inevitable and often negative, community and environmental impacts of their businesses. Palliatives can help but environmental restoration and conservation together with improved livelihoods can make a substantial difference to the political acceptability and public profile of the enterprise. Unlike virtually all petrochemical processes, forestry and improved agricultural practices do not require skilled labour and are benefits which can be provided in the earliest stages of project development. There can also be significant benefits from demonstrable biodiversity and freshwater conservation. Perhaps most importantly of all, natural carbon storage offers the one known method of genuinely greening petroleum products.

If, as seems inevitable, the pressure to clean up the fossil fuel industrial base continues and the increased scrutiny which the industry will face grows more intense – particularly as its relative share of the market declines – there would seem to be compelling reasons for industry participants to explore for green carbon as well as black.

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