

# Carbonomics: Strategic Management Accounting Issues

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## Abstract

*The possibility of costly disruption from rapid climate change either globally or locally, calls for greater attention to carbon management in the decision making process. Business entities need to consider issues such as trading in carbon allowances (or permits), investment in low- CO<sub>2</sub> emission technologies, counting the costs of carbon regularity compliance and passing on the increased cost of carbon regulation to consumers through higher prices. Consumers need to consider if, given a choice, they are willing to pay a higher price for CO<sub>2</sub> neutral products and services so as to play their part in reducing CO<sub>2</sub> emissions. Such considerations require information for informed decision making, thus the need for strategic management accounting techniques and measures is evident. This paper reports on a research study that was conducted to study the impact of the Kyoto protocol on issues relating to the managerial accounting profession.*

*This study discusses how strategic management accounting information would facilitate decisions on business policy, HRM, marketing, new product development (NPD), promotional, pricing, international business and supply chain management strategies; and the resultant evaluation of performance.*

## Keywords

**Carbon Management Accounting  
Carbonomics  
Carbalisation  
Global Warming  
Kyoto Protocol**

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## Introduction

In recent times the burning of fossil fuels like oil— in which CO<sub>2</sub> has been stored for millions of years – has led to unprecedented levels of greenhouse gas emissions in the atmosphere. This is more so when combined with the accelerated land clearance and urbanisation taking place worldwide to house an ever increasing population. This raised significant concern that human economic and consumption activity is the principle cause of global warming. This warming calls for greater attention and precautionary measures to be put in place; a key initiative in this area is the Kyoto protocol, which dictates how governments, business entities and consumers would need to change behaviour in a new economic environment, termed ‘Carbonomics’.

The impact of the ‘Kyoto Protocol’, and the resultant trading of carbon credits via a ‘cap and trade’ system on financial accounting (Ratnatunga, 2007a) and cost management (Ratnatunga, 2007b) has already been discussed in previous editorials. This editorial reports on a study that concentrated on how strategic managerial accounting considerations will impact on carbon emission reduction activities.

Currently, there is no literature available in the academic journals that deal specifically with the impact of carbon trading on managerial accounting theory and practice. As a first step to understand the issues, a research study was conducted to study the impact of the Kyoto protocol on strategic management accounting in the second half of 2003.<sup>1</sup>

The researchers felt that the undertaking of an empirical-descriptive study of practices in the field was of little value as the area was so new and there were little (if any) practices to report. What was required, therefore, was ‘theory building’ research of a normative or prescriptive nature. Such

<sup>1</sup> The research project was financed by the Institute of Certified Management Accountants (ICMA) (Australia) under its competitive grants scheme.

theory building research was just starting in financial accounting and auditing. This study therefore looked at the strategic management accounting area by canvassing the views of practitioners in the area.

### Carbonomics

One of the recommendations of the Kyoto protocol is that a *cap-and-trade* scheme is established in a signatory country. It would work like this: companies are told how much CO<sub>2</sub> they can emit (the cap). If they produce less than the cap, they have surplus credits for sale.<sup>2</sup> If they emit more than their cap they can buy credits from other businesses that come in under their cap (the trade). Trade takes place in an over the counter market, or via a Carbon Credit Exchange trading market.

Business entities will need to consider new business practices in order to take advantage of (or at least not be disadvantaged by) mandatory carbon rationing and trading schemes under the Kyoto protocol. The key issue is the extent and direction which the existence of a carbon rationing and trading market may affect business strategy, financial performance and organisational value.

To determine this, a good understanding of a number of elements of business accounting and finance are required, such as the economic modelling of demand and supply of carbon credits and allowances, forward and spot pricing, risk management business value, capital allocation and the (possible) International Financial Reporting Standards (IFRS) directives for accounting for carbon and related transactions. In addition, taxation issues of direct carbon taxes, value-added (VAT) and goods and services (GST) taxes, and transfer pricing implications of carbon trading need to be considered.

To date, the focus (if any) has been mainly on financial statement accounting assurance and taxation (see Ratnatunga, 2007a). Little, if any, work has been done by the accounting profession on strategic

management accounting, including marketing valuation and performance management issues.

The issues relating to carbon cost management have already been discussed (Ratnatunga, 2007b). Once product costs are known, the wider issues of strategic management accounting need to be considered. These include strategic marketing, pricing, demand modelling, capacity usage, risk management, cash flow, capital investment, capital structure and financing issues.

Mandatory or voluntary carbon costs are eventually going to flow on to prices and the competitiveness of industries and countries. Manufacturers in countries subject to more controls will feel penalised if these controls allows offshore manufacturers from developing countries (who are possibly less environmentally efficient) to get a competitive advantage. Such an imbalance will not only cause concern from an economic perspective, but may do little to prevent global warming from an environmental perspective as eventually from where the CO<sub>2</sub> is emitted is of no consequence to the warming of the globe. This issue will be discussed later in this paper, under the section 'Carbalisation'.

Even within a country, there will be winners and losers. In Australia, a report produced the *Business Roundtable on Climate Change*<sup>3</sup> found that early action by companies to reduce CO<sub>2</sub> emissions would add A\$2 trillion to GDP by 2050 and create more than 250,000 jobs (Weekes, 2007). Such jobs will be created within companies in some industries (such as electricity companies) that are in the more enviable position of being able to use carbon credits earned by switching from coal fired to gas generators or alternative energy sources like wind farms to offset carbon debt. Similarly, forestry and logging companies can expand as they now have assets (if grown after 1990) from which they can find a second

<sup>2</sup> Called 'Renewable Energy Credits (RECs).

<sup>3</sup> Formed by BP, Insurance Australia Group, Origin Energy, Swiss Re, Visy Industries and Westpac along with the Australian Conservation Foundation.

source of income via carbon credits.<sup>4</sup> Suppliers of such alternative energy sources will also have a competitive advantage as they market the technology or processes that net-emitters will then purchase to offset their CO<sub>2</sub> emissions. However, a majority of companies may not have opportunity to reduce their emissions in any significant way to impact its bottom line, let alone reduce global warming.

The TIME Magazine (2007) suggests 51 things that can be done by governments, organisations and individuals to reduce CO<sub>2</sub> emissions. Of these, a list has been extracted by the author as to what businesses can do (Table One).

As one can see, not all businesses can implement the big-ticket items such as building skyscrapers, capturing the CO<sub>2</sub> in sinks, burning clean coal, manufacturing bio-fuels, and setting higher CO<sub>2</sub> emission standards. Most of the other items that remain, whilst collectively important, will not have much impact on CO<sub>2</sub> emission levels within organisations. However, the embrace of a 'carbon efficient lifestyle' by an organisation and ultimately individuals (Table Two) will have a significant impact on many businesses. For example, incandescent light bulb, paper, business attire, energy, packaging, transportation, airline and car manufacturing companies will have to adopt or die. There will be job losses in such industries as carbon lifestyle choices change. There may also be movement of employees from carbon efficient (but less comfortable) business environments to those that do not implement such measures.

These actions, if undertaken in large numbers by organisations and individuals, will have a significant impact on strategic management accounting information systems. This will not only affect demand forecasts in industries already impacted by business actions, such as energy, paper, housing, petroleum, packaging,

transportation, airline, whitegoods and car manufacturing companies, but also impact on fashion, food, entertainment, farming and horticulture industries. The cost to economy of such shifts in demand in terms of both impact on GDP and job losses need to be factored into the economic equation.

Earlier a reference was made about the positive impact of 'carbonomics' on the GDP and on jobs in a report produced the *Business Roundtable on Climate Change* in Australia. Leaving aside the methodology adopted to come to the conclusions reached in the report, this brings about an interesting economic question. Does the existence of a possible catastrophic situation actually add to GDP and create jobs? The answer is clearly in the affirmative. A close parallel could be existence of the Aids virus. This has certainly added to GDP and jobs via medical research, training of doctors and health care professionals, drug company patents and sales of condoms to name a few. Many related industries have also benefited. Governments have also benefited via the taxation of these new income sources. The cost of human suffering, however, does not impact on the GDP figures, and in some countries helps in reducing unemployment rates. The wiping out of the virus would have a negative impact on GDP and job rates.

Global warming is the equivalent of the Aids virus caught by Earth. There would be money to be made in trying to prevent the ultimate result if this catastrophic situation is left unabated, i.e. the death of most forms of life on Earth, including humans.

The study of 'carbonomics' may, therefore, be the key to human survival as a species. As such, the issues relating to carbon management accounting as of vital importance and thus were discussed at length in 31 research symposiums in 11 countries in the period mid 2003 to early 2007. A total of 638 respondents participated. The participants all held senior positions in their organisations.

<sup>4</sup> This is not unlike a coconut tree that has a residual value in its trunk for construction after its nuts are plucked.

**Table One: Carbon Reduction Methods for Business**

Change Lightbulbs to Low Emission	Shut off Computers (no standby)
Pay the Carbon Tax	Switch off the Lights At Quitting Time
Build a Skyscraper <sup>5</sup>	End the Paper Chase
Turn Up the Geothermal Heat	Play the Market
Capture the Carbon	Think Outside the Packaging
Let Employees Work Close to Home	Trade Carbon for Capital
Pay Your Bills Online	Set an Organisational Carbon Budget
Open a Window	Pay For Your Carbon Sins
Ask the Experts For An Energy Audit	Make One Right Turn After Another
Buy Green Power	Plant a Tree in the Tropics
Remove the Tie (Everyday is Casual Friday)	Drive Green (Bio fuelled company vehicles)
Fly Straight to Location	If You Must Burn Coal, Do it Right
Copy California's State Emission Levels	Set a Higher Carbon Emission Standard
Turn Food Into Fuel (Bio Fuels)	Illuminate Public Spaces with LEDs

**Table Two: Carbon Reduction Methods for Individuals**

Get Blueprints for a Green House	Fly Straight between Locations
Change Light bulbs to Low Emission	Support your Local Farmer
Pay the Carbon Tax (via Higher Energy Costs)	Plant a Bamboo Fence
Move from the Mansion	Buying Wine etc., Locally
Hang Up a Clothes Line	Remove the Tie (Casual Business Attire)
Give New Life to Your Old Warm Clothes	Rake in the Fall Colours (No Leaf Blowers)
Use More Geothermal Heat	Just Say No to Plastic Bags
Take Another Look at Vintage Clothes	Switch off the Lights At Quitting Time
Work Close to Home	Shut off your Computer
Ride the Bus	End the Paper Chase
Move to a High-Rise Building	Think Outside the Packaging
Pay Your Bills Online	Trade Carbon for Capital
Open a Window (natural cooling)	Make Your Garden Grow
Ask the Experts For An Energy Audit of Your Home	Wear Green Eye Shadow (Made from Renewable Resources)
Buy Green Power, At Home or Away	Fill Car Up With Passengers
Check the Label (the cheap price for overseas sourced products may be because no Carbon costs are paid)	Drive Green on the Scenic Route using Bio-Fuel Cars
Properly Insulate Your Water Heater	Check Your Tyres
Avoid the Meat Products	Set a Personal Carbon Budget
Be Aggressive about Passive Houses	Consume Less, Share More, Live Simply
<i>There were a number of items that were relevant to both businesses and individuals</i>	

<sup>5</sup> Star ratings are now given (up to a maximum of 6-Stars) for development of 'green buildings' in Australia. (Michelle Draper and Marc Pallisco, "Building the Green Credentials", The Age, Business Day, April 11, 2007, p.7.)

**Table Three: Issues in Strategic Management Accounting**

<i>SMA Issue</i>	<i>Carbon Management Impact</i>
<b>Business Policy</b>	
<i>Primary Objective</i>	Sustainable Value Creation
<i>Competitive Advantage</i>	Carbon efficiency seen as a marketing mix variable in product differentiation. An ECM focus also taken in cost leadership strategies.
<i>Line-of-Business</i>	Efficient Carbon Management (ECM) seen as a potential line-of-business
<i>Competition and Industry Structures</i>	Adding a sixth force to Porter's Five Forces Model - the impact on the Industry of Carbon regulation (Porter, 1980 and 1983).
<i>Gap Analysis</i>	Strategies considered to close gap between current emission levels and future emission targets
<i>Environmental Externalities</i>	Considered 'internalities' in product-market decision making and HRM
<i>Risk Management</i>	Consideration of the impact on cash flows and reputation of the company as a result of the carbon strategy positioning of the company. Risk vs. Reward outcomes (e.g. cash flow at risk) should be considered.
<b>Human Resource Management</b>	
<i>Corporate Culture</i>	A carbon lifestyle culture from grass roots level upwards. Low carbon footprint activities encouraged. Excellence sought in seeking continuous improvement in ECM
<i>Empowerment</i>	Employees given resources and responsibility to participate in ECM in lowering the organisation's carbon footprint
<b>Marketing Strategy</b>	
<i>Products and Markets</i>	Carbon impact considerations considered systematically in all product-market strategies
<i>Marketing Research</i>	Undertaken to determine the needs of customers in terms of participating in reducing carbon emissions and the incremental price they are willing to pay for this (carbon consciousness)
<i>Market Segmentation</i>	Separating customers geographically, demographically and psychographically in terms of their carbon consciousness.
<i>Positioning Strategy</i>	Consideration of taking an 'active or 'passive' positioning in terms of ECM as a source of competitive advantage.
<i>The Product Life Cycle (P.L.C.)</i>	Consideration of the carbon footprint left by product throughout its life cycle, especially in the decline and obsolescence stages.
<i>Market Penetration Strategies</i>	Using carbon efficiency of existing products as an attribute to sell more to existing carbon conscious customers
<i>Market Development Strategies</i>	Using carbon efficiency of existing products as an attribute to sell new carbon conscious customers in new segments
<i>Product Development Strategies</i>	Incorporating carbon efficiency as an attribute in new product designs to keep existing carbon conscious customers loyal to the brand
<i>Diversification Strategies</i>	Leaving industries having products and markets seen as high carbon emitting to new industries better long-term carbon sustainable prospects (includes investments in JIs, and CDMs under Kyoto).
<i>Experience Curves</i>	Organisations with high experience in ECM products and services should have lower costs.
<i>Budgeting for Marketing Activities</i>	Budgets will incorporate ECM activities as potential revenues and cost savings. Carbon trading activities could be considered a separate line of business.

<b>Product Marketing Strategies</b>	
<i>The Product Portfolio (BCG) Matrix</i>	Star products will have high market share and high market growth opportunities in industries with better long-term carbon sustainable prospects.
<i>New Product Development (NPD)</i>	Designing products and services to meet carbon emission targets and marketing them as such
<i>Product Abandonment Approaches</i>	Product Review Teams to consider carbon footprint in addition to profitability targets
<i>Inflation</i>	The passing on of mandatory carbon costs and taxes as higher prices to consumers will cause inflation.
<i>Packaging</i>	Consideration given to carbon footprint of packaging, in terms of functionalism, convenience, recyclability and also image.
<i>After-Sales Service</i>	The carbon emission in terms of materials, labour and overhead of undertaking work due to meeting warranties and other after sales services should be costed into the product
<b>Pricing Strategy</b>	
<i>Pricing Analysis</i>	Carbon costs, carbon related competitor activity and the value of low-carbon footprint products to carbon conscious customers should be considered in such analyses
<i>Elasticity of Demand</i>	The impact on demand due to changes in prices if carbon costs are incorporated.
<i>Skimming</i>	Selling to high carbon conscious customers willing to pay a price well above costs
<i>Penetration</i>	Absorbing carbon costs of products and services sold to low carbon conscious customers to develop brand awareness. Productivity improvements can only be obtained either by lowering costs via ECM or changing customer carbon consciousness levels.
<b>International Business Strategy</b>	
<i>Exporting vs. International Operations</i>	Carbon costs can be reduced via Joint Implementation (JI) and Clean Development Mechanism (CDM) investments as per the Kyoto protocol
<i>Price Differentials and Carbon Dumping</i>	Competing with countries that do not have carbon costs. Influencing government policy to impose countervailing carbon taxes.
<i>Hedging Policies</i>	Ensuring that carbon credits in the overseas country is not devalued in terms of the parent country carbon credit pricing.
<b>Promotional Strategy</b>	
<i>Promotional "Pull" Strategy (via Advertising etc.)</i>	An Integrated Marketing Communication (IMC) approach should be taken to promote how the product or service is reducing carbon footprint, e.g. via purchasing carbon offsets.
<i>Promotional "Push" Strategy( via Sales Force)</i>	Sales Force budgets, targets and incentive schemes geared towards extolling the attributes and pushing low carbon impact products. Travelling times on sales calls minimised to reduce carbon emissions. Bio-fuel cars used as sales vehicles
<i>Sales Response Functions</i>	Response of sales volume to carbon related promotions tracked.
<i>Media Selection Strategies</i>	Electronic media given higher priority to print media in order reduce paper usage

<b>Supply Chain Strategies</b>	
<i>Product-Distance</i>	Carbon emission measurements in terms of Product-Distance. The longer the distance and the more players in the channels of distribution the higher is the carbon costs.
<i>The Level of Service</i>	The Service - Cost Trade-off required ensuring that the right product gets to the right place at the right time, should consider the carbon emissions required to provide this level of service.
<i>Distribution Cost Accounting</i>	Computation of carbon related costs in order processing, warehousing, transportation, credit control, and inventory control.
<i>Transportation and Simplex Models.</i>	The use of these models to reduce transportation time and resulting reduction in carbon emissions.
<i>Channel Control</i>	Consideration of the motivation, relationships and conflict issues that arise when channels are asked to on-sell products and services using ECM approaches themselves
<i>Channel Adaptability</i>	Consideration of the adaptability of channels to changes in product-market combinations as a result of reducing carbon footprint.
<i>Distribution Cost Control</i>	Using ratio analysis to ensure that, in addition to economic analysis, ECM in supply chain activities are also evaluated.
<b>Performance Evaluation</b>	
<i>Strategic Financial Structures (Gearing)</i>	Consideration if carbon related investments should be financed via debt or equity. Ability to obtain shareholder and debtholder funding at favourable rates due to the use of such financing in ECM activities.
<i>Weighted Average Cost of Capital (WACC)</i>	If financing of carbon related investments can be isolated, then calculating an organisation's carbon related Cost of Equity and Debt to calculate its overall Carbon-WACC. The equity and debt market may value discount carbon intensive businesses (causing high financing costs) and place a value-premium on low carbon emitting businesses (causing low financing costs).
<i>Corporate Performance Perspectives</i>	ROI and Residual Income (EVA) used to evaluate not only economic performance but ECM performance. If carbon related revenues and costs can be isolated as a separate line of business, this will enhance the evaluation.
<i>Strategic Value Analysis</i>	Calculation of value enhancement (or diminution) due to strategies relating to carbon related investments and operations
<i>Valuing Strategic Investments</i>	Valuation premium given to investments in ECM, such as investments in alternative energy assets and abatement activities. Examples are wind, biomass, solar, geothermal, nuclear and clean coal.
<i>Valuing Strategic Operations</i>	These include operational adjustments to incumbent assets, changes to energy prices, efficiencies in waste management, purchasing and sale of carbon credits and carbon related taxation.
<i>Free Cash Flows</i>	Net Cash flows generated by carbon related activities less investments in carbon related non-current and current assets
<i>The Business Value</i>	The Net Present Value of expected future cash flows generated by strategic investments and operations in carbon related business.
<i>The Balanced Scorecard</i>	Corporate Report Card to incorporate financial and non-financial KPIs with carbon focus. This could in addition to, or incorporated with the customer, innovation, internal business processes and financial focus.
<i>Economic Value Added (EVA)</i>	A charge against revenue is made for the cost of investments in carbon efficient assets. A separate Carbon-EVA can be calculated if carbon related net-income, investments and cost of capital can be isolated.

Although the discussion of issues was free flowing, the researchers guided the discussion to the carbon emissions area. All discussions were recorded, and the key points extracted from the symposiums are presented in Table Three.

It can be seen that carbon emissions management cuts across a wide spectrum of strategic issues from, overall objectives, to marketing, new product development, pricing, international business, promotion, supply chain management, finance and risk management. New thinking, tools and management practices will be required if the accounting profession is to remain at the forefront of providing relevant information for decision making in this new economic paradigm of Carbonomics.

### Carbalisation

We have already alluded that global warming is the equivalent of the Aids virus caught by Earth. Unlike the Aids virus, however, CO<sub>2</sub> emissions cannot be reasonably contained and controlled within a country. The issue must be tackled globally and the Kyoto protocol is a first step. The problem is that the protocol considers the world in terms of developing and developed, instead of considering a 'Single-Earth' policy<sup>6</sup>. The result is that, at present, countries are taking a very parochial stance in the implementation of the protocol.

Such a parochial stance will, at least in the short run, cause a shift in world trade. For example, in recent years there has been a significant shift from 'localisation' to 'globalisation', especially with the opening up of China, India and the Easter block (Levitt, 2006). However, as more people are encouraged to work closer to home, buy produce from the local farmer, and have a 'Green Wedding' by buying wine etc. locally, (TIME, 2007), then a shift back to localisation is possible. We have termed shift in world trade as, '*Carbalisation*'.

<sup>6</sup> Further, some major sources of CO<sub>2</sub> emissions are not covered by Kyoto, such as Global Shipping.

'Carbalisation' is based on the concept of product-distance (in miles or kilo meters), i.e. the distance a product travels to get to its place of final purchase for consumption. Separate studies by the oil giant BP and the German Institute for Physics and Atmosphere released earlier in 2007 revealed the world's shipping could have a serious impact on global warming. Annual emissions from shipping made up 5 per cent of the global total, while the aviation industry, which is subject to far greater scrutiny, contributes only 2 per cent (Vidal, 2007). CO<sub>2</sub> emissions from ships do not come under the Kyoto agreement, and only few studies have been undertaken. Although CO<sub>2</sub> emissions on a per-kilogram basis were significantly lower for shipping when compared with air freight, it is distance that has been targeted as most imports of fast moving consumer goods (FMCGs) are mostly imported via shipping lines.

An example is given of imported bottled water from Europe using approximately 80 kg of CO<sub>2</sub> emissions per metric tonne of bottles to be shipped to Australia, whilst from Egypt it is 70 kg and from nearby Fiji only 20 kg (Perkins, 2007). The urging of the report is similar to the TIME magazine recommendations, i.e. buy from sources as close as possible to point of purchase (Table Two).

Further, as consumers become 'carbon sensitive' by checking labels before buying, any labour cost advantages of products from countries such as China may disappear.<sup>7</sup> Another concern expressed by some economists is that if the developed world takes the cost impact of CO<sub>2</sub> emissions cuts<sup>8</sup>, this will reduce the purchasing power and the standards of living of the people in the developed world.

<sup>7</sup> Countries may impose a 'countervailing tax' on such items if they are seen to be 'dumping' high carbon emission products in a country.

<sup>8</sup> By between 60 and 90 % as per The Stern Review, The Economics of Climate Change see [http://www.hm-treasury.gov.uk/Independent\\_Reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/Independent_Reviews/stern_review_economics_climate_change/sternreview_index.cfm) (accessed April 18 2007)



Thus although (developing world) countries like China and India are allowed to catch-up by not having stringent CO<sub>2</sub> emitting standards, the economic growth of these countries will anyway be stunted by the loss of purchasing power in the developed world, in addition to behavioural adjustments of their population to buy locally due to Carbalisation.

It is clear therefore that Carbonomics and carbalisation will produce winners and losers in both the product and allowances markets, and in organisations and countries. In the products and services market the *winners* will be ‘low carbon intensity’ firms and those that can pass on their carbon costs. Some of these firms could earn windfall profits. The *losers* will be ‘high carbon intensity’ firms and those that are unable to pass on their carbon costs. As the loser’s profits reduce, there will be a loss of market share to the winners.

In the allowances market, the *winners* would be countries ‘on-track’ for meeting Kyoto standards. These countries (and companies within them) will have a higher proportion of required allowances allocated free, and could earn windfall profits from the sale of these allowances. The losers will be countries a long way from Kyoto compliance, that will need to purchase a higher proportion of allowances from the market.

## Summary

The concentrations of greenhouse gases in the atmosphere have risen dramatically leading to an out-of-balance greenhouse effect that most scientists believe will continue to cause a very rapid warming of the world’s climate. The possibility of costly disruption from rapid climate change either globally or locally, calls for greater attention and precautionary measures to be put in place. Governments, business entities and consumers would be impacted by the extent to which such precautionary measures are incorporated in their decision making process.

These decisions and their consequences will impact the management accounting

profession significantly. Information from the strategic management accounting systems will be particularly useful in this new economy that global warming has forced upon us. New thinking will be required to provide strategic management accounting information for business policy, HRM, marketing, new product development (NPD), promotional, pricing, international business, supply chain management strategies and the resultant evaluation of performance evaluation.

The new Carbonomics and the return to localisation due to place-distance carbon emission costs (termed Carbalisation) will produce winners and losers in both the product and allowances markets, and in organisations and countries. The management accounting profession must also re-engineer itself to be a ‘winner’ in this new economic paradigm.

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