



Carbon Footprint Management in Your Supply Chain

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Click-On Logistics Ltd**



Proposed Agenda

- Introduction
 - Who I am
 - What we do
- Carbon Management
 - Structure & Method
 - Lean Logistics?
 - Case study examples
- Open Discussion



Who I am

- Mechanical Engineer
- Ist job Project Engineer
- Cranfield MSc in 1983
- Consultancy ever since
 - PW / PwC
 - Click-On Logistics Ltd from Feb 2000



What we do

Process Based work in Supply Chain – A broad remit!

- Top Down
- Strategy & Planning
 - Change Management
 - Project Implementation

Examples of Specifics

- Lean Operations
- Carbon Footprint Management
- Supply Chain Sustainability
- Warehouse design
- Cost Reduction
- Risk Management
- Outsourcing
- Merger & Acquisition support
 - Due Diligence & Post Implementation
- Ergonomics
- Performance Management
 - pay schemes, scorecards etc

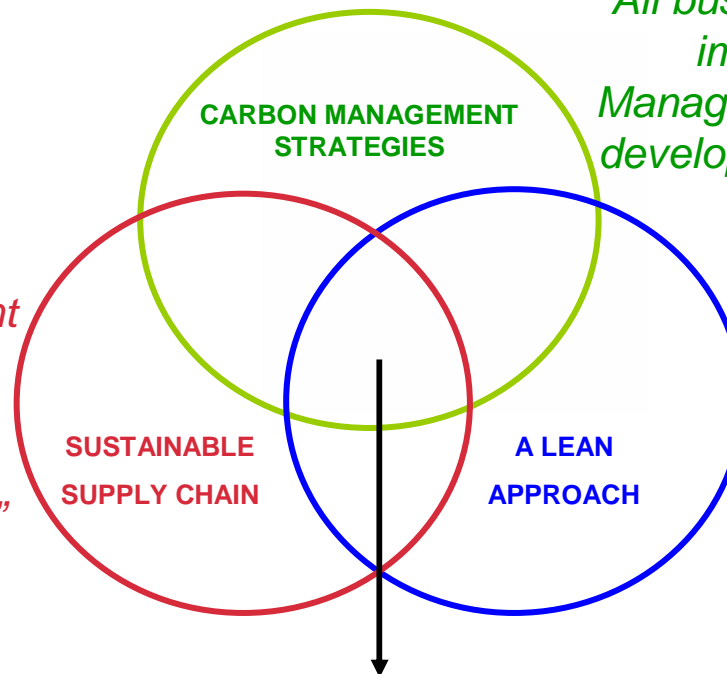


The Key Messages

“We focus on cost effective supply chain management solutions with an emphasis on logistics infrastructure issues and the associated change management. We use lean principles to implement change, and we provide carbon friendly, sustainable solutions”


“All businesses are aware of the importance of Carbon Management, we help Clients to develop and implement relevant Carbon Strategies

“Sustainability means different things to different businesses, we help clients to identify and implement Sustainable Supply Chain Strategies”



“We have adopted the core methods and evaluation techniques of Lean to Supply Chain operations to remove waste and improve efficiency”

This overlaps represents the basis of Future Strategic Supply Chain Considerations

A background image showing a hand holding a globe of the Earth, symbolizing global responsibility and environmental awareness.

Carbon Measurement in the Supply Chain – Awareness..... Why Calculate?



Background

- Public awareness of climate change is growing and pressure to act is becoming manifest
- Increased Consumer awareness and impact upon consumer choice for products and services
- Political response with both policies and rhetoric
- Companies will attempt to gain environmental kudos and use carbon emissions (good or bad) as part of the marketing mix
- A certain inevitability regarding Carbon tax?

*It's not going to go away from the business agenda:
it is becoming an enduring management priority*



The Challenge

- Competing Pressures
 - On Political Agendas
 - On the Corporate Agenda
 - On our Personal Agendas

- Where to start?
 - Carbon?
 - Sustainability?
 - Environment

Can all of these be incorporated within “*Business as Usual*” ?

*“Where to start?” Is the most common question
“Anywhere you like” is the most common answer*



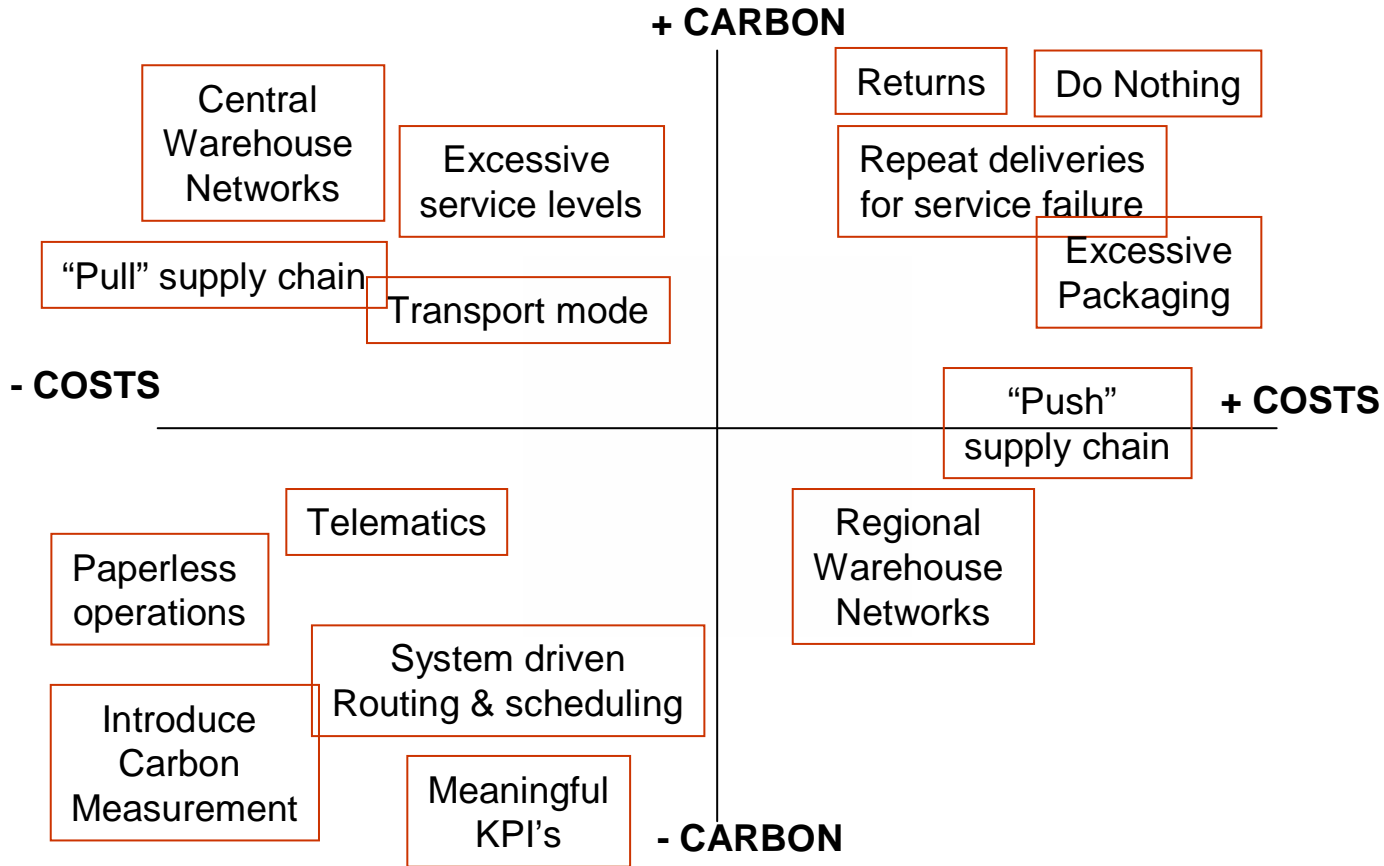
The Options

1. *Do Nothing*
2. *Reduce Carbon in what you do now*
 1. *Do what you do now, in a more Carbon friendly manner*
3. *Change what you do*
 1. *Consider the sustainability of current products, services and routes to market*
4. *Introduce renewable energy sources*
5. *Consider offsets*

In the real world we have to consider Carbon and Costs



The Solutions? – or something to think about...



Can we recognise "Carbon Added Value" solutions in our own Supply Chains?



Macro Situation

50% of FTSE 250 Companies have calculated their CFP
(Data Source Carbon Trust)

Less than 2% of overall UK businesses have calculated their CFP
(Data Source Carbon Trust)

Carbon Disclosure Project now in Year 5: Global Investor Community collaboration; 22 sectors; 144 suppliers

- **96% of Suppliers see GHG Regulation as a potential risk**
- **58% report Scope 1 & 2 emissions (own energy, purchased electricity)**
- **12% report Scope 3 emissions (generated by others elsewhere)**
- **26% have established GHG reduction targets in place**

Corporate Sustainability policies are increasingly assisting in defining brand image & *competitive advantage*

Lots of information out there, but little structure to work within, particularly relating to Supply Chain. Biggest barrier to progress is a lack of common standards.

*An evolving situation, with increasing momentum.
We are at an early stage of this journey...*



Impact of Consumerism

“I would change to another Brand or own label if I thought that....”

- The alternative product had less packaging 65%
- The alternative product was in a recycled or recyclable packaging compared to my usual product 63%
- The company that made it used more locally sourced products or ingredients 59%
- The company that made it was more environmentally friendly than my usual brand 46%
- The alternative product had a lower carbon footprint 42%

SOURCE: NIELSEN HOMESCAN SURVEY JULY 2007

*Consumers are increasingly influencing
Sustainability in the Supply Chain*



Orientation / Maturity Scale

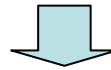
	<u>Awareness</u>	<u>Calculation</u>	<u>Development</u>	<u>Corporate</u>	<u>Supply Chain</u>
Description	<ul style="list-style-type: none"> • Issue awareness. • Desire to reduce impact. 	<ul style="list-style-type: none"> • Measurement of own direct CFP (Process & Service). 	<ul style="list-style-type: none"> • Positive actions and communicated desire to reduce Carbon 	<ul style="list-style-type: none"> • Integration with business decision making. 	<ul style="list-style-type: none"> • Collective impact assessment (suppliers & customers).
Behaviour	<ul style="list-style-type: none"> • General consideration. • No measurement • Desire to develop 	<ul style="list-style-type: none"> • Local Carbon KPIs & targets • Internal communication • Establishing data sources 	<ul style="list-style-type: none"> • Ongoing measurement • Establishing Carbon Reduction programme. 	<ul style="list-style-type: none"> • Setting of carbon goals. • Aligning operational, carbon and financial data. 	<ul style="list-style-type: none"> • Collaborative working • Full supply chain CFP calculation.
Actions	<ul style="list-style-type: none"> • Basic energy conservation. • Recycling 	<ul style="list-style-type: none"> • Raising internal awareness 	<ul style="list-style-type: none"> • Employee and customer feedback. 	<ul style="list-style-type: none"> • Brand protection or development • Reductions • Sourcing 	<ul style="list-style-type: none"> • Behavioural influencer.

Most Companies can find their starting place on such a matrix, it need not be painful



Carbon Management Summary: The Journey from Analysis to Solution

Marketing & Awareness



Measurement Assignment/Opportunity Assessment



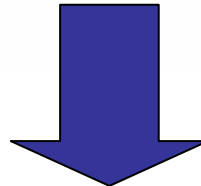
Measurement
all that is reqd
for now

Understood
measures, only
want to take
tactical actions

Understood
measures, want
to consider
strategic options

Desire to use
measures for
PR brand
enhancement
etc

Other
Company
specific
objective



Carbon
Off-setting

Sustainable
Energy
Options

ERP software
Integration
Carbon
Accounting

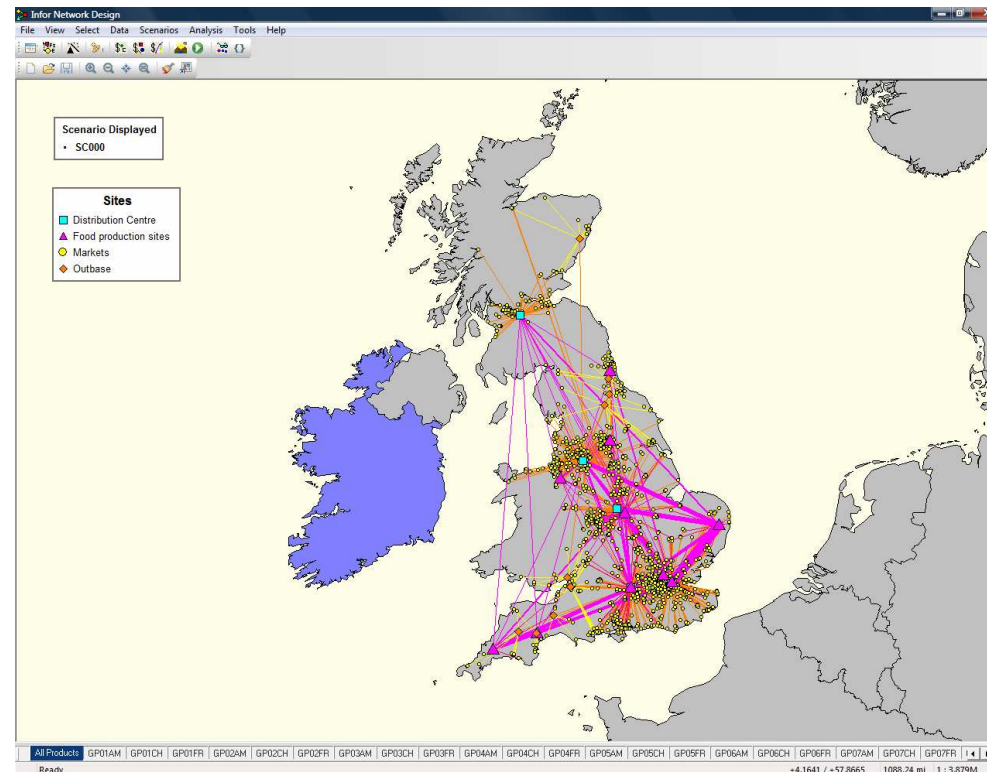
Supply Chain
Strategy
Re-design

Lean Supply
Chain Process
Development

“Strategic PR”



Supply Chain Planning Tools



Most Strategy Planning Tools now incorporate Carbon Calculators

- Good planning information, helpful for policy setting
- Fast access to useful data and “what if?” scenario calculations
- Carbon conversion factors for all transport modes
- But, they don’t give you a Carbon Reduction Strategy, this requires an experienced hand & much interpretation



Carbon Management in the Supply Chain

Calculation Method & Considerations





Carbon Footprint Measurement Process

- 4 Steps:

Step 1: → Scope Definition & Boundaries

Step 2: → Build Supply Chain Process Map

Step 3: → Collect and Analyse Data

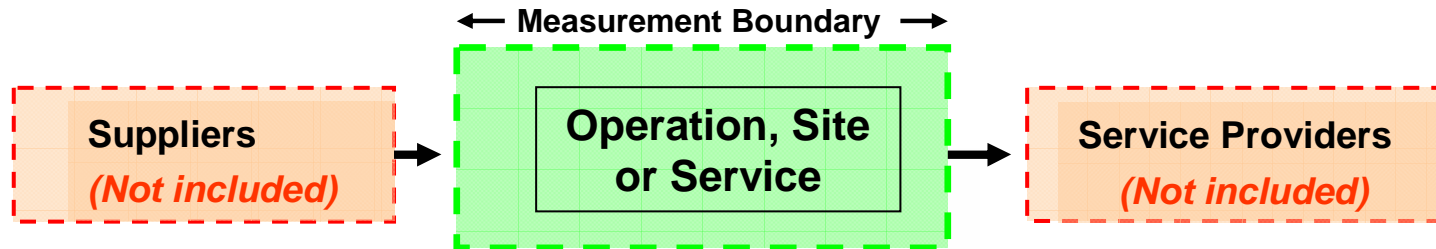
Step 4: → Calculate Carbon Emissions by Product & Process

The measurement process is the first stage of the Carbon Management Journey!

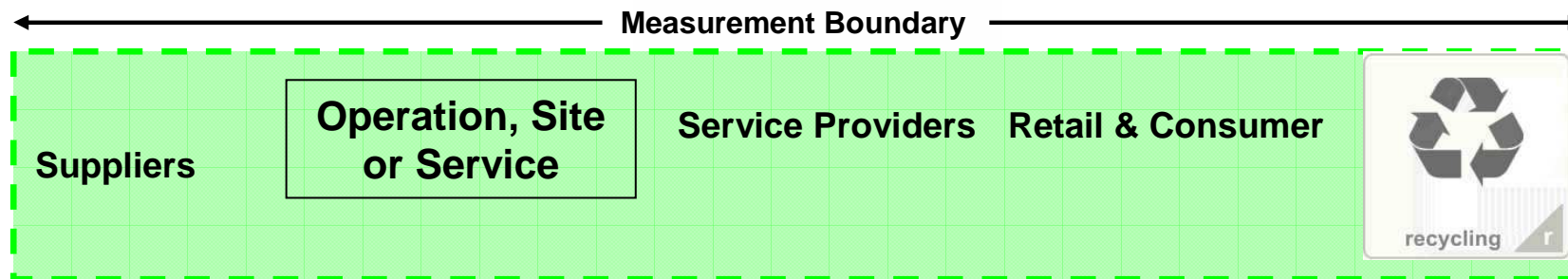


Step 1: Boundaries & Data

Direct Carbon Footprint Measurement:



Total Carbon Footprint – Full Product Cycle:



Measurement can be progressive – decide what you are trying to achieve.



Step 1: Boundaries & Data

- Identify operational boundaries (*process start & finish*).
- Identify boundary conditions (what is to be included): Energy sources over which we have direct or indirect control?
 1. **Direct Business Carbon (Scope 1&2) – include:**
 - Petroleum Fuels, Oils & Lubricant
 - Electricity & Gas
 - Refrigerants & Propellants
 2. **Indirect Business Carbon (Scope 3) – includes carbon generated by suppliers, distributors etc which may not apply:**
 - Building Materials
 - Primary Supply
 - Disposal
- Identify data requirements + sources
- Agree the most appropriate conversion method

It's all about boundary definition and starting a process, it doesn't have to be perfect!



Step 2 – Supply Chain Process Map

Define the Supply Chain process map and identify inputs, outputs and processes.

- The process typically covers the following steps:



Sub Process	Raw Materials	Processes:	Storage	Storage
	Inbound Supply	Production	Co-Pack	Retail
		R&D	Picking etc	Consumption
		Sales	Transport	Disposal
		Packaging	Returns	

According to the level of detail required we can produce sub-levels of process detail in iGrafx



Step 3 - Primary & Secondary Data

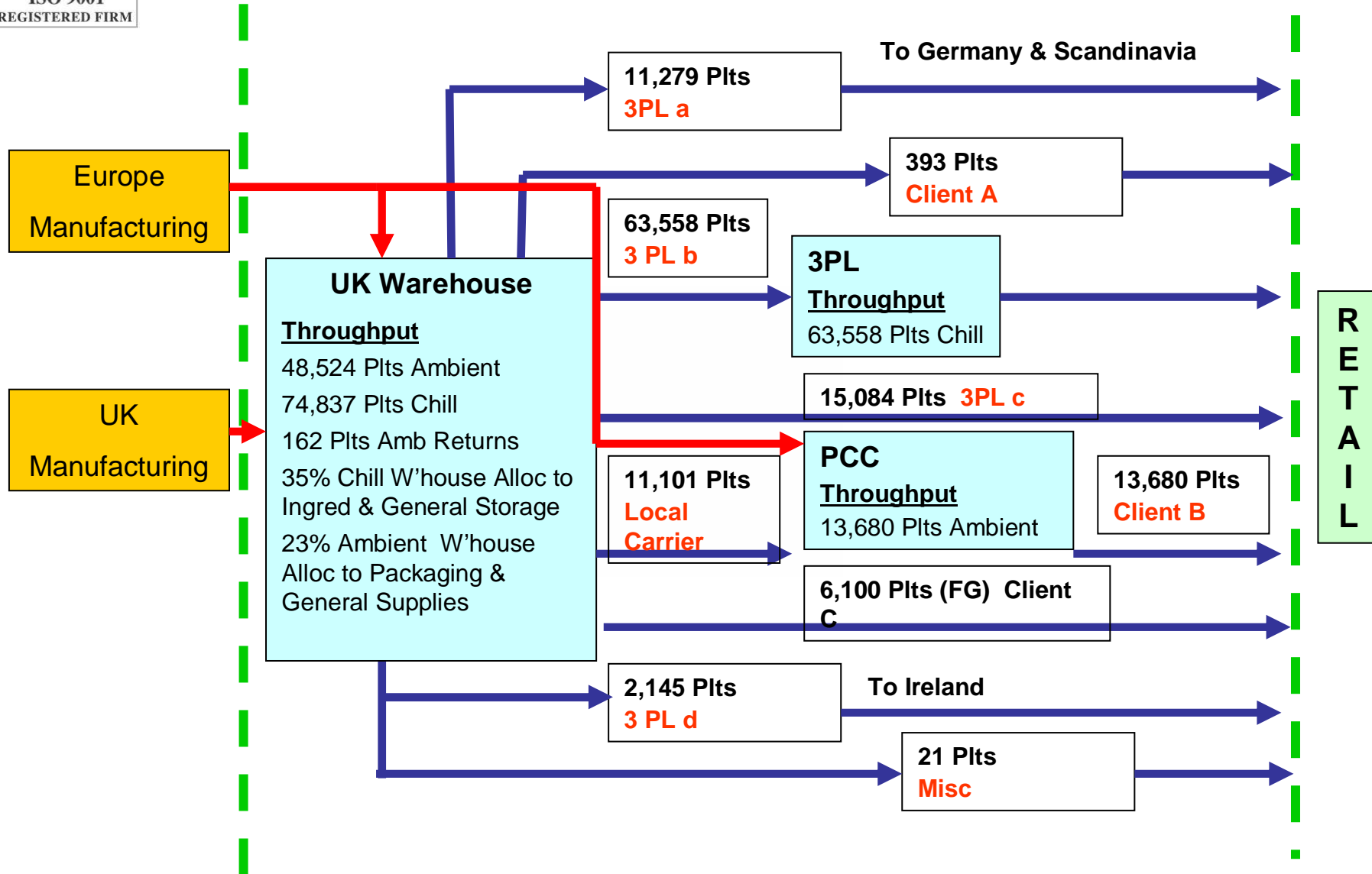
Collection of data to develop overall business and process CFPs:

- **Data (Directly Measured Scope 1,2)**
 - Preferable as energy emissions can be measured accurately
 - Examples
 - Electricity (KwHrs)
 - Gas (m³)
 - Diesel and other oils (Litres)
 - Refrigerants & Propellants (m³/Litres)
- **Indirect Data (Scope 3)**
 - Examples
 - Carbon associated with RM & packaging manufacture (Supplier/OEM)
 - Service providers (transport and warehousing)
 - Use of generic coefficients

Indirect data may or may not be used, according to the application



Activity Map - Example





Step 4 – Emission Calculations

- Energy data is manipulated into Kwhours
- Use of emission coefficients to convert energy/direct gas to Kg of CO₂
- Fuel emission factors are UK Emission Trading Scheme (ETS) international standards (many others are in common use)
- CO₂ emissions scaled to account for any minor processes excluded from analysis
- Allocation of process to individual product groups
- On completion of each step CO₂ emissions added together to obtain overall Carbon Foot Print

The calculation process is not an exact science, and it doesn't need to be – the aim is to reduce emissions against a start point that can be audited



Base Data

- The table below shows the units of energy consumed by depot and the associated operational activity and throughputs.

	MD	MK	PP	PR	Total
Litres Road diesel	3,872,352	2,995,135	1,614,252		8,481,739
Red diesel	337,326	537,644	685,400		1,560,370
Kms	7,889,060	6,670,076	2,098,956		16,658,092
Vehicles	72	45	31		148
Pallets delivered	640,843	451,312	262,399		1,354,554
W/house pallet throuhpu	729,428	589,713	522,116		1,841,257
MHE	12	65	89		166
KWH electricity	14,400,000	4,625,358	4,500,000	147,670	23,673,028
Gas m³	500,000	134,999	134,999		769,998
Pallets stored	14,614	8,359	11,723		34,696



Total Carbon Foot Print

	MD	MK	PP	PR	Total
Diesel	11,366	9,539	6,209	0	27,114
Electricity	6,192	1,989	1,935	63	10,116
Gas	1,155	312	312	0	1,779
	18,713	11,839	8,456	63	39,008

- By energy source the table shows the Carbon Footprint as being 39,000 tonne pa.
- For interest, credible carbon offsetting prices vary between £6.00 and £8.50 per tonne; the potential unit cost of carbon neutrality.



Carbon by Transport Activity

Transport (Throughput)

Unit of Measure	MD	MK	PP	PR	Total
Carbon Tonnes	11,366	9,539	6,209	0	27,114
Pallets Delivered	640,843	451,312	262,399	0	1,354,554
Carbon T/Plt Deliv	0.018	0.021	0.024		0.020

To 3 decimal place so = Kgs per unit of measurement

Transport (Distance)

Unit of Measure	MD	MK	PP	PR	Total
Carbon Tonnes	11,366	9,539	6,209	0	27,114
Kms	7,889,060	6,670,076	2,098,956	0	16,658,092
Carbon T/Plt Deliv	0.0014	0.0014	0.0030		0.0016

Differentials

1. Data capture and inclusion?
2. Transport mpg (payloads, vehicle fill, other?).



Carbon by Warehouse Activity

Warehouse (Throughput)

Unit of Measure	MD	MK	PP	PR	Total
Carbon Tonnes	7,347	2,301	2,247	63	11,958
Pallets Thougput	729,428	589,713	522,116	0	1,841,257
Carbon T/Plt Throughput	0.010	0.004	0.004		0.006

To 3 decimal place so = Kgs per unit of measurement

Warehouse (Storage)

Unit of Measure	MD	MK	PP	PR	Total
Carbon Tonnes	7,347	2,301	2,247	63	11,958
Pallets Stored	14,614	8,359	11,723	0	34,696
Carbon T/Plt Stored	0.503	0.275	0.192		0.345

Differentials

1. Data capture and inclusion?
2. Warehouse throughput and storage (inclusion of HO, age of building, pallet dwell time?).

A background image showing a hand holding a globe of the Earth, symbolizing global impact and sustainability.

Reduction? Sustainable Energy? or Offsetting?

Reduction or Alternatives?

1. Seek to **reduce** or source *alternatives* before offsetting.
2. Reduction = *cost down* (reducing energy consumption). Offsetting, = *cost up* (we pay for what we produce).
3. Reduction initiatives:
 1. Review working processes / consider efficiency schemes / lean logistics
 2. Collaborative or collective working.
 3. Influence customer or supplier behaviours.
 4. Procure or generate energy from renewable sources
4. Sustainable Energy Sources are becoming increasingly popular



Low CO₂ supply chains or processes will be cheaper to operate and more competitive

Offsetting

What is it?

- Compensates for emissions with an equivalent CO₂ saving. It **does not** reduce emissions.

How can you offset ...?

- A number of companies sell offsets. Best Practice code is being established (end of 08), accreditation will result in a Government quality mark.

How much does it cost ...?

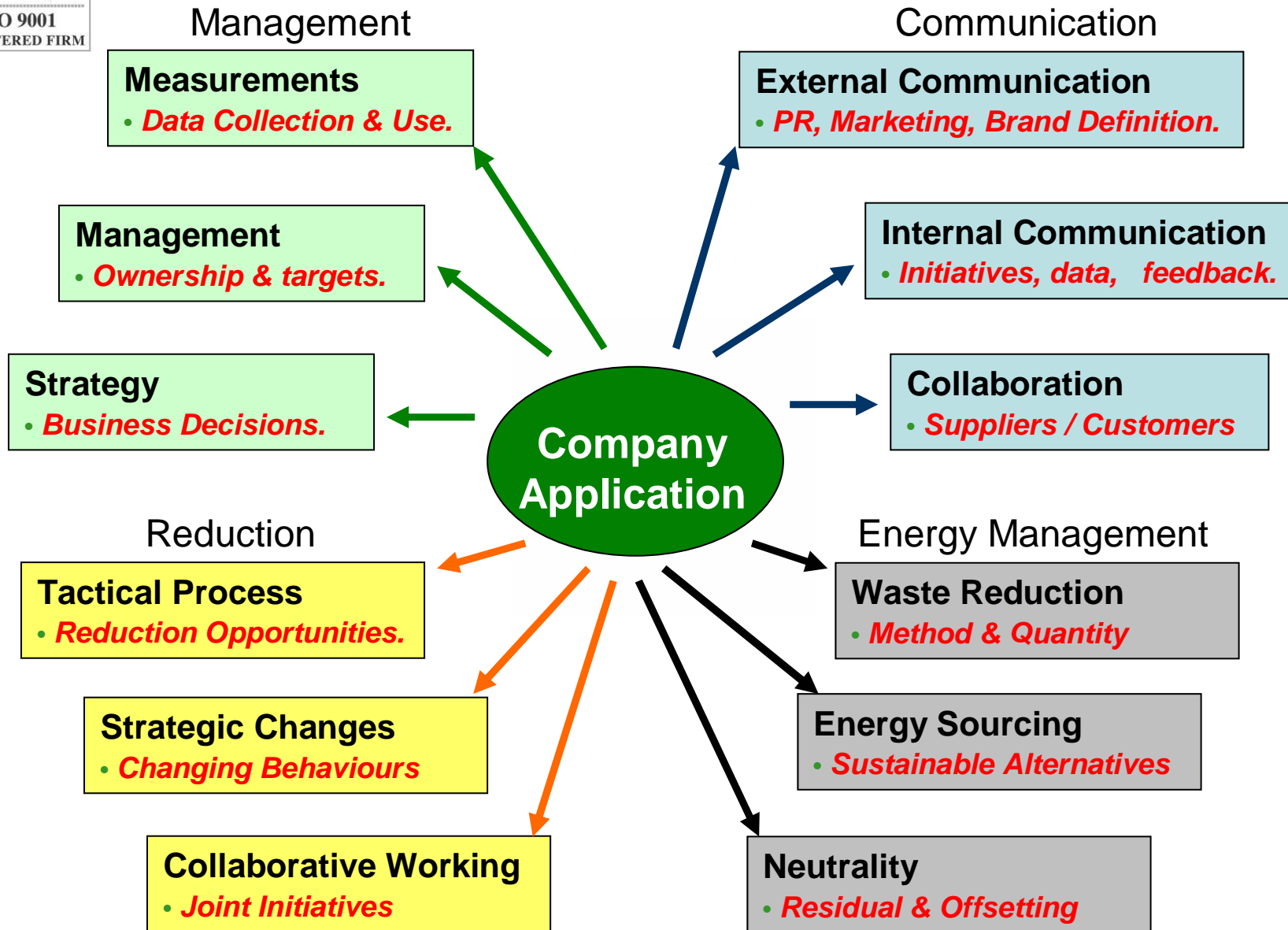
- Depends on company, scheme and credibility ranges £8 - £14 tonne
- Unregulated area of much debate & cynicism



There is a role for Offsets particularly where Carbon reduction is not economic



Typical Elements of a Carbon Strategy





Benefits

- Brand Leverage
- Opportunity for competitive advantage
- Ahead of the legal requirement to report Carbon emissions
- Potential cost reduction
- Potential to influence customer behaviours
- Attract the customers you want
- Attract the Investors you want
- Genuine environmental well being
- Integrated component of CSR plan
- And many others, business specific



Does Lean mean Carbon Reduction?

“Doing more with less by not doing unnecessary things”

- Opportunities include:
 - Increased throughput / storage capacity of an existing facility or network
 - Increased overall site performance per capita
 - Standardised processes
 - Increased employee engagement & motivation
 - Improved service to customers
 - Fewer discrepancies
 - Faster response – reduced shelf stock
 - Reduced carbon footprint
 - Supplier engagement in operations improvement
 - Sustainable and continuous improvement
 - Reduced costs



The 7 Wastes in a Supply Chain Context

1. Unnecessary Transport (equipment)
Poor warehouse layouts; sub-optimal delivery routes; empty running
2. Excessive Inventory
Receiving backlogs; unprocessed returns; dead stock; single SKU containers
3. Wasted Movements (personnel)
Multi-stage replenishments; poor picking layouts; searching for equipment
4. Waiting between processes
Slow replenishments; arriving too early for a delivery slot; work imbalance
5. Overproduction
“Getting ahead”; failing to prioritise; queuing vehicles
6. Overprocessing
Excessive checking; over packing; cycle counting; low value returns
7. Defects
Cross picks; wrong address; incomplete orders; invoicing errors; rework

*In addressing these target areas, savings in
Time, Cost and Carbon can be achieved*



Carbon Management Case Studies



Alpro Soya



- Global Soya milk and associated food product manufacturer
- Marketed as a “green” organisation
 - Healthy mind / body / planet
 - CEO visited Antarctic personally, sponsors research
- Stated Intention to be Carbon Neutral, working on a strategy to achieve this
- Want to manage Carbon on their own terms
 - Meet their own objectives *and* Customer needs
- Already doing their bit
 - Factory gate back haul
 - Shared haulage for smaller loads
 - Measuring Carbon



Alpro Soya



- Calculation of Direct CFP
- Development of Carbon Plan specifically on Energy consumption
 - Use of site facilities over 7 days
 - Stop using energy that isn't needed
 - Cold store issues addressed
 - Weekend working doesn't need whole site illuminated
 - 08 Energy Plan shows considerable benefits
- Looking further at:
 - Communications, Marketing & PR
- Ongoing review of optimised carbon strategy
- Sustainable energy sourcing
- Offsetting assessment
- Now considering wider areas, and boundary extension



UDG Case Study

- Multi-User distributors to the Pharma sector, 100+ vehicles, >600k sq ft high security warehousing
- Calculation of *Direct* Carbon Foot Print.
- Scope – Receipt of product, internal processes to customer delivery.
- Calculation of total and individually allocated Client CFPs.
- Identification of Carbon Reduction Initiatives and development of reduction Plan.
- Progressive introduction measurement and of Carbon KPIs
- Engagement with Customers on allocated Carbon
- Considering next steps within UDG and within Customer operations





Best Practice Example (from Adnams Web site)



Investment in our eco-distribution centre and energy efficient brewhouse, through to our lightweight bottle and Environmental Action Group Adnams is at the forefront of the environmental agenda

What makes it carbon neutral?

High yielding barley, grown and malted in East Anglia
English Boadicea Hops are naturally aphid-resistant, reducing need for pesticides

Adnams energy efficient brewhouse

Adnams lightweight beer bottle (-25% of comparable bottle)

Tiny amount of remaining CO2 will be offset.

	HIGH EMISSIONS SCENARIO PRE 2006 gCO ₂ eq per bottle	HIGH EMISSIONS SCENARIO POST 2006 gCO ₂ eq per bottle
Barley production	43g	43g
Malting process	19g	19g
Brewing process	81g	66g - 18.5%
Transport	39g	31g - 20.5%
Bottling process	66g	54g - 18%
Bottle Manufacture	334g	219g - 34%
TOTAL	583g	432g - 26%
tC _e	159gC _e	118gC _e



How to get to the other side: Summary of do's and don'ts

Don't be afraid of it...

You can't afford to be

Define green ultimately as carbon neutrality

And it's not that bad actually

Really mean it

Cynicism will catch up with you

And you CAN make a difference

Do something, it will move you further ahead than you think



Some useful Information Sources
(there are plenty of others too...)

Carbon Disclosure Project

www.cdproject.net

www.edie.net

www.carbonmanagers.com

www.2degreesnetwork.com

Greenhouse Gas Protocol site

[**www.ghgprotocol.org**](http://www.ghgprotocol.org)

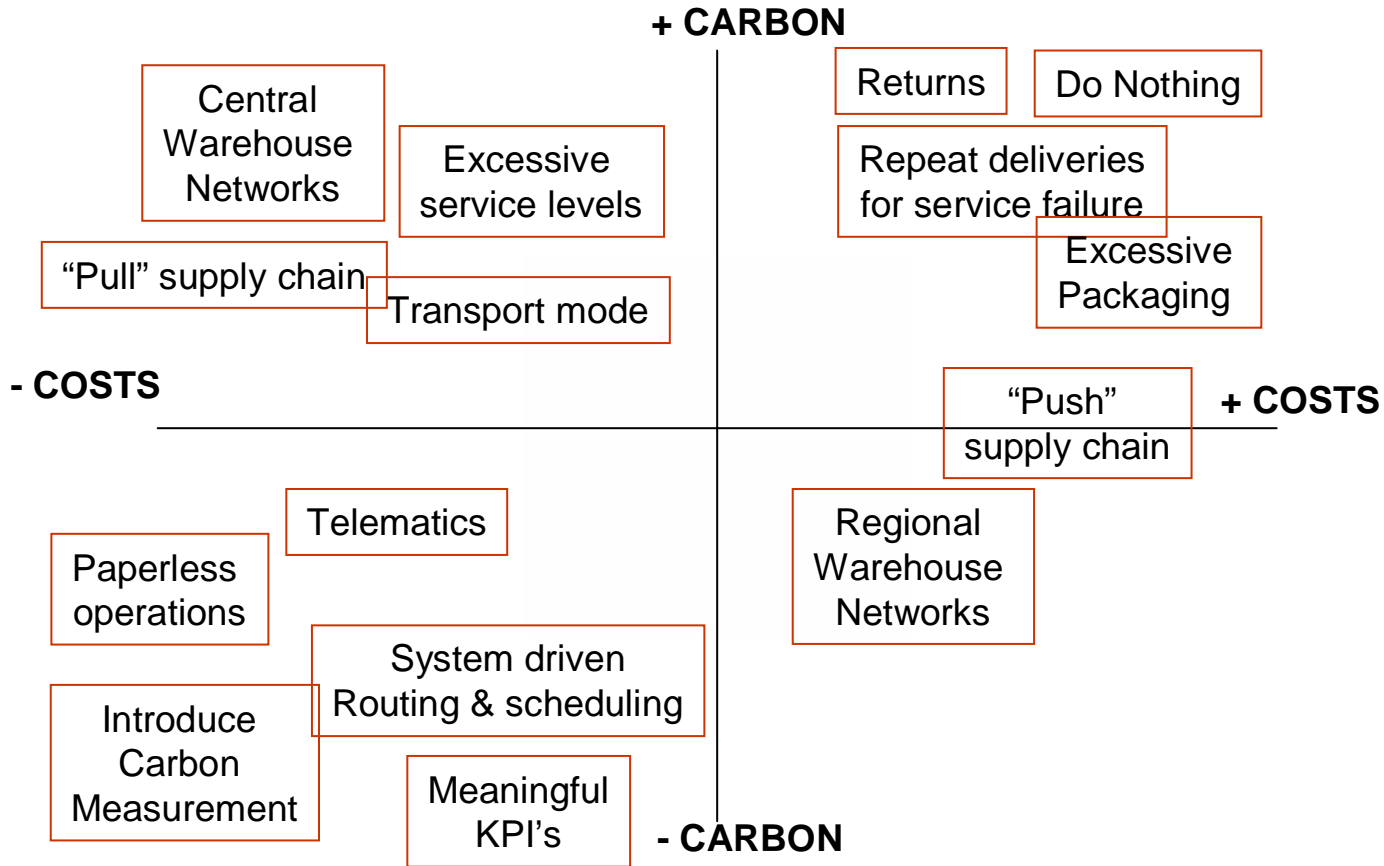
[**www.carbontrust.co.uk**](http://www.carbontrust.co.uk)



Open Discussion Future Opportunities



The Solutions? – or something to think about...



Can we recognise “Carbon Added Value” solutions in our own Supply Chains?



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