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*Creating Measurable and Sustainable Value*

# The Development of ISKANDAR Malaysia with Clean Technologies & Low Carbon Footprint

- A strategic & sustainable **BUSINESS SOLUTION**  
**TOWARDS A LOW-CARBON FUTURE**

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**John Paul**

Professor & Research Fellow  
BEM (Bordeaux Ecole de Management), France

Qualified SCOR® Instructor  
by Supply Chain Council

Managing Director, iCognitive

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PLAN SOURCE MAKE DELIVER RETURN



# Agenda

- The Development of ISKANDAR Malaysia
  - ✓ *The involvement of Malaysia government sector*
  
- Supply Chain Management (SCM) to Reduce Carbon Footprint
  - ✓ *Low-carbon businesses against climate change*
  - ✓ *Green Supply Chain Management*
  - ✓ *Carbon emission reduction and management along the supply chain*
  
- Green Initiatives for ISKANDAR Malaysia
  - ✓ *Objectives in Green SCM - Business Partner Selection & Performance Monitoring with the focus on Carbon Management*
  - ✓ *Tool for Green SCM - optimising the capital costs on various clean technologies during the development*



## The Development of ISKANDAR Malaysia: the involvement of Malaysia government sector

### ISKANDAR Malaysia



- ✓ formerly known as Iskandar Development Region (IDR) and South Johor Economic Region (SJER)
- ✓ among the high-impact developments of the Ninth Malaysia Plan, put into action by the Prime Minister of Malaysia in March 2006 to cover the period of 2006 to 2010
- ✓ administered by Iskandar Regional Development Authority (IRDA), a Malaysian Federal Government statutory body with the objective of regulating and driving various stakeholders in both public and private sectors
- ✓ Towards the vision of developing into a strong and sustainable metropolis of international standing



## The Development of ISKANDAR Malaysia: the involvement of Malaysia government sector

### **Comprehensive Development Plan (CDP) & Seven Strategic Social Development Thrusts (SSDT)**

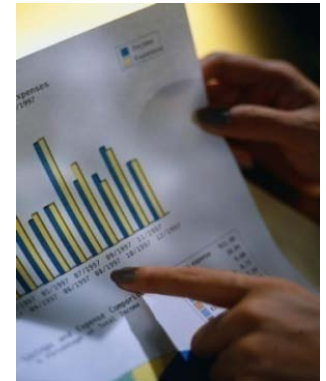
- ✓ SSDT 1: *Improve inter-agency coordination in social development of government and non-governmental agencies*
- ✓ SSDT 2 : *Enhance social capital*
- ✓ SSDT 3 : *Empower individual and privately-owned Bumiputra companies*
- ✓ SSDT 4 : *Increase property values of Bumiputra land through development*
- ✓ SSDT 5 : *Distribute the benefit of improved property values by promoting mutual funds*
- ✓ SSDT 6 : *Emphasize education and professional training*
- ✓ SSDT 7 : *Integrate Bumiputra companies into the clusters of major public and private corporations and research institutions*



## The Development of ISKANDAR Malaysia: the involvement of Malaysia government sector

### **Comprehensive Development Plan (CDP)**

- ✓ **Green Blueprint in Residential Development**
  - ✓ Maximizing energy efficiency
  - ✓ Implementing a 'Green Building' Rating
- ✓ **Commercial Development**
  - ✓ Aiming at a "Strategic Catalyst Development"
  - ✓ Developing waterfront areas, promoting tourism, expanding healthcare and iconic areas
  - ✓ Mixing commercial and residential development





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# SCM to Reduce Carbon Footprint

## Low-carbon businesses against climate change

*CO<sub>2</sub> is a major greenhouse gas which causes global warming.*

### The main greenhouse gases

Greenhouse gases	Chemical formula	Pre-Industrial concentration	Concentration in 1994	Atmospheric lifetime (years)***	Anthropogenic sources	Global warming potential (GWP) *
Carbon-dioxide	CO <sub>2</sub>	278 000 ppbv	358 000 ppbv	Variable	Fossil fuel combustion Land use conversion Cement production	1
Methane	CH <sub>4</sub>	700 ppbv	1721 ppbv	12,2 +/- 3	Fossil fuels Rice paddies Waste dumps Livestock	21 **
Nitrous oxide	N <sub>2</sub> O	275 ppbv	311 ppbv	120	Fertilizer industrial processes combustion	310
CFC-12	CCl <sub>2</sub> F <sub>2</sub>	0	0,503 ppbv	102	Liquid coolants Foams	6200-7100 ****
HCFC-22	CHClF <sub>2</sub>	0	0,105 ppbv	12,1	Liquid coolants	1300-1400 ****
Perfluoromethane	CF <sub>4</sub>	0	0,070 ppbv	50 000	Production of aluminium	6 500
Sulphur hexa-fluoride	SF <sub>6</sub>	0	0,032 ppbv	3 200	Dielectric fluid	23 900

Note : pptv= 1 part per trillion by volume; ppbv= 1 part per billion by volume, ppm v= 1 part per million by volume

\* GWP for 100 year time horizon. \*\* Includes indirect effects of tropospheric ozone production and stratospheric water vapour production. \*\*\* On page 15 of the IPCC SAR. No single lifetime for CO<sub>2</sub> can be defined because of the different rates of uptake by different sink processes. \*\*\*\* Net global warming potential (i.e., including the indirect effect due to ozone depletion).

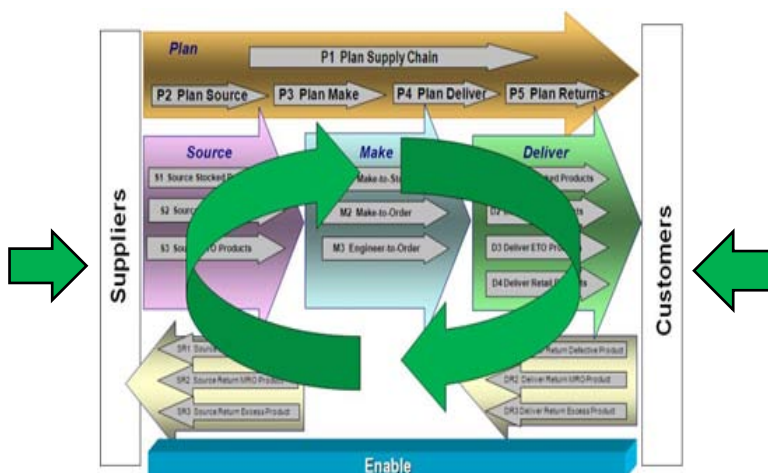


# SCM to Reduce Carbon Footprint Green Supply Chain Management (SCM)

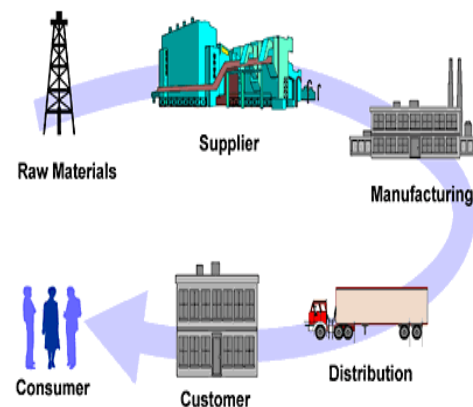
Green SCM integrates Environmental and Supply Chain Management .



Environmental Management



Green SCM



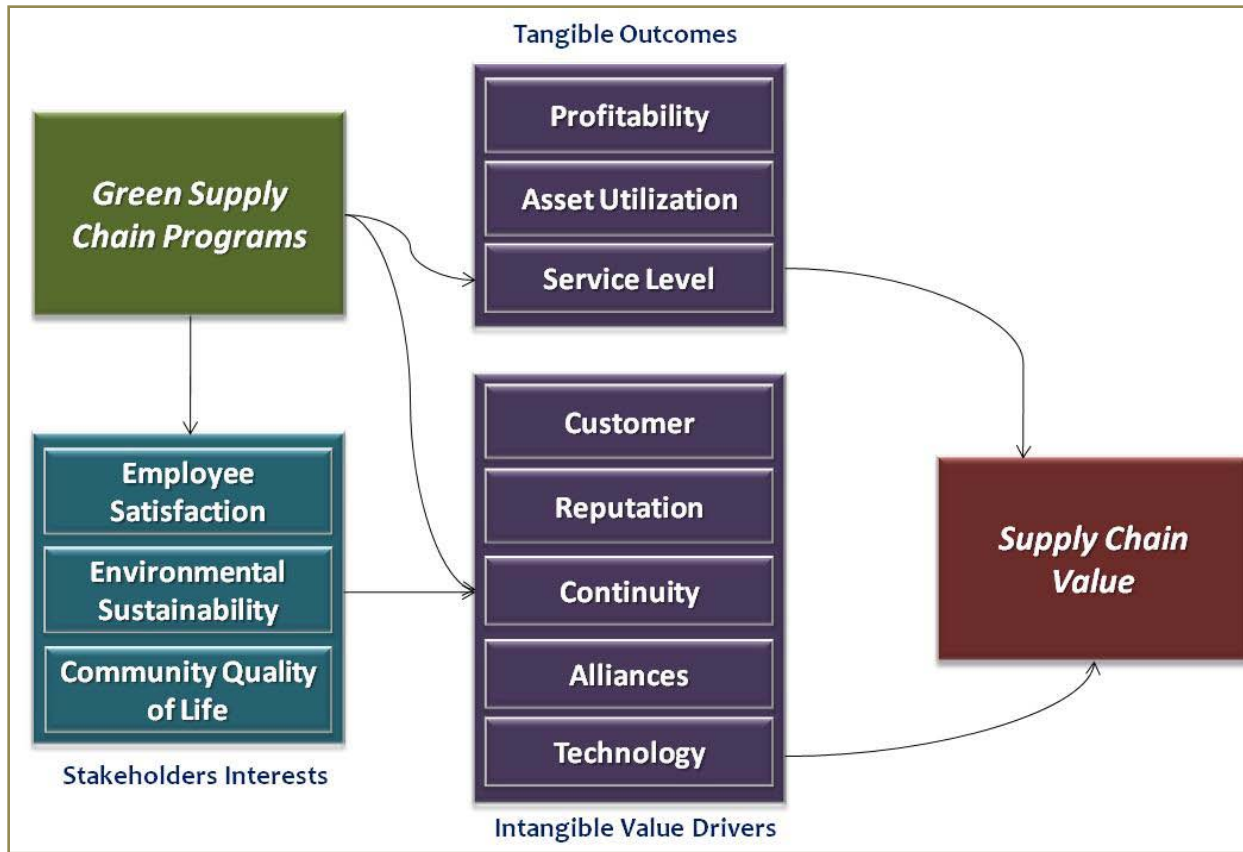
Supply Chain Management





## SCM to Reduce Carbon Footprint

### Green Supply Chain Management (SCM)



**Green SCM  
leverages the role of  
the Environment in  
SC value creation**



## SCM to Reduce Carbon Footprint Green Supply Chain Management (SCM)



### **Green Supply Chain Best Practices**

- *Align Green SCM goals with business goals*
- *Evaluate the supply chain as a single cycle system*
- *Use green supply chain analysis as a catalyst for innovation*
- *Focus on source reduction to reduce waste*
- *Supply chain integration with Suppliers and Customers*
- *Green supply chain maturity model*



## SCM to Reduce Carbon Footprint Green Supply Chain Management (SCM)



### Green Supply Chain improves Operations

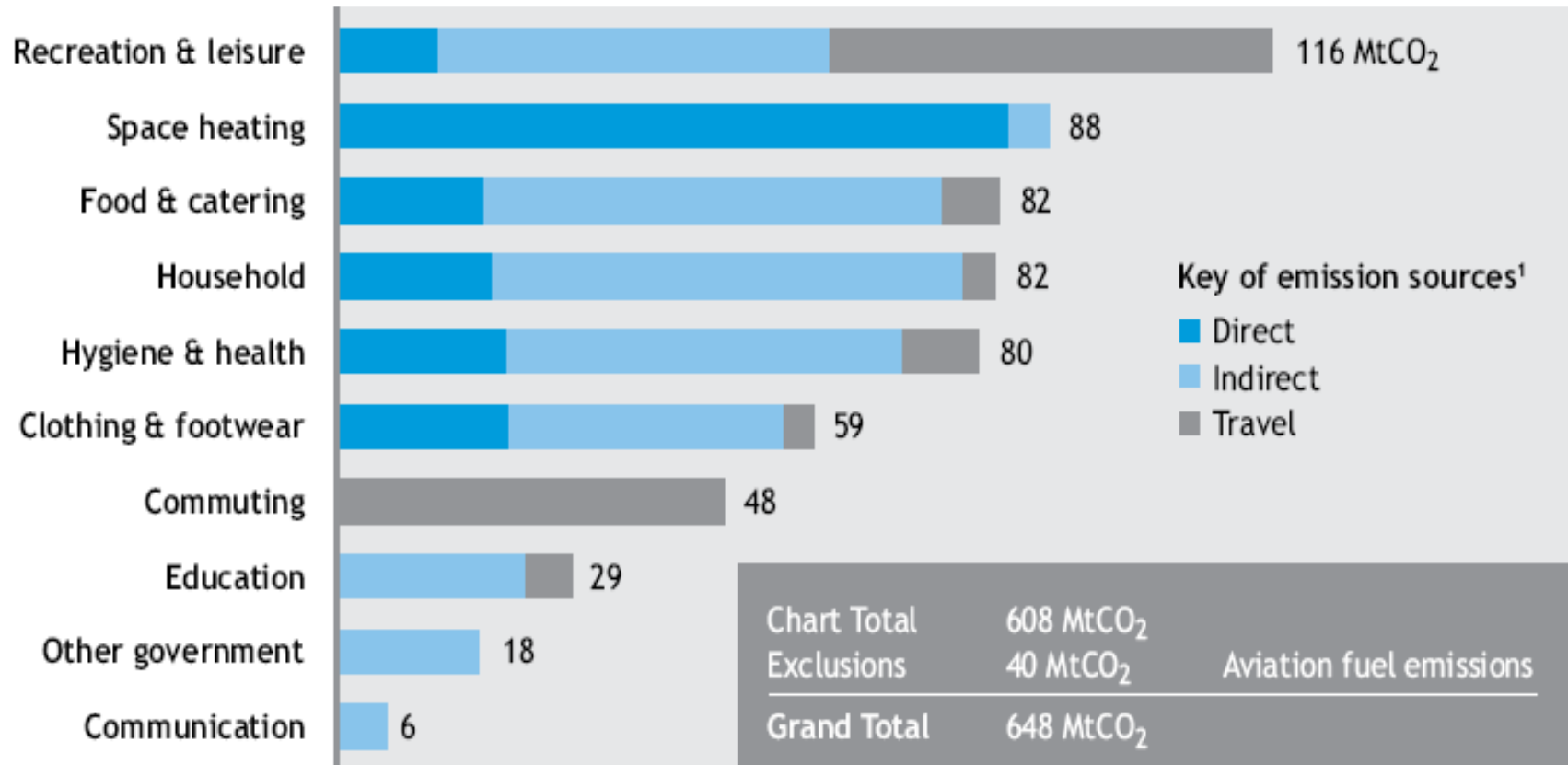
- Improves **Agility** – Green supply chain management helps mitigate risks and speeds up innovations
- Increases **Adaptability** – Green supply chain analysis often leads to innovative processes and continuous improvement
- Promotes **Alignment** – Green supply chain management involves negotiations policies with suppliers and customers, which results in better alignment of business processes and principles



## SCM to Reduce Carbon Footprint

### Green Supply Chain Management (SCM)

#### Carbon emissions by industry sector



Source: Carbon Trust Report (CTC603), 'The carbon emissions generated in all that we consume', using the UK Carbon Attribution Model, Centre for Environmental Strategy, University of Surrey, 2006.



# SCM to Reduce Carbon Footprint

## Carbon emission reduction & management



**Traditional energy and carbon management initiatives analyze the operations of single companies or even single sites.**

**The supply chain approach extends this analysis to cover specific processes from multiple sites and multiple companies operating in a single supply chain.**

**There are three stages that a company can focus on to reduce carbon emissions and mitigate climate change.**



# SCM to Reduce Carbon Footprint

## Carbon emission reduction & management



Stage	Description
<b>Stage 1:</b> <b>Direct Emissions Reduction</b>	✓ Reduces directly controlled emissions through, for example energy efficiency and low-carbon energy supply
<b>Stage 2:</b> <b>Indirect Emissions Reduction</b>	✓ Reduces emissions and costs across the supply chain and helps develop revenue opportunities from low-carbon products
<b>Stage 3 (Optional):</b> <b>Offsetting</b>	✓ If appropriate, offsets emissions using high quality offsets from verified projects that create truly additional emission reductions





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## Green Initiatives for ISKANDAR Malaysia

### Carbon Management as the Major Objective



### Initiatives

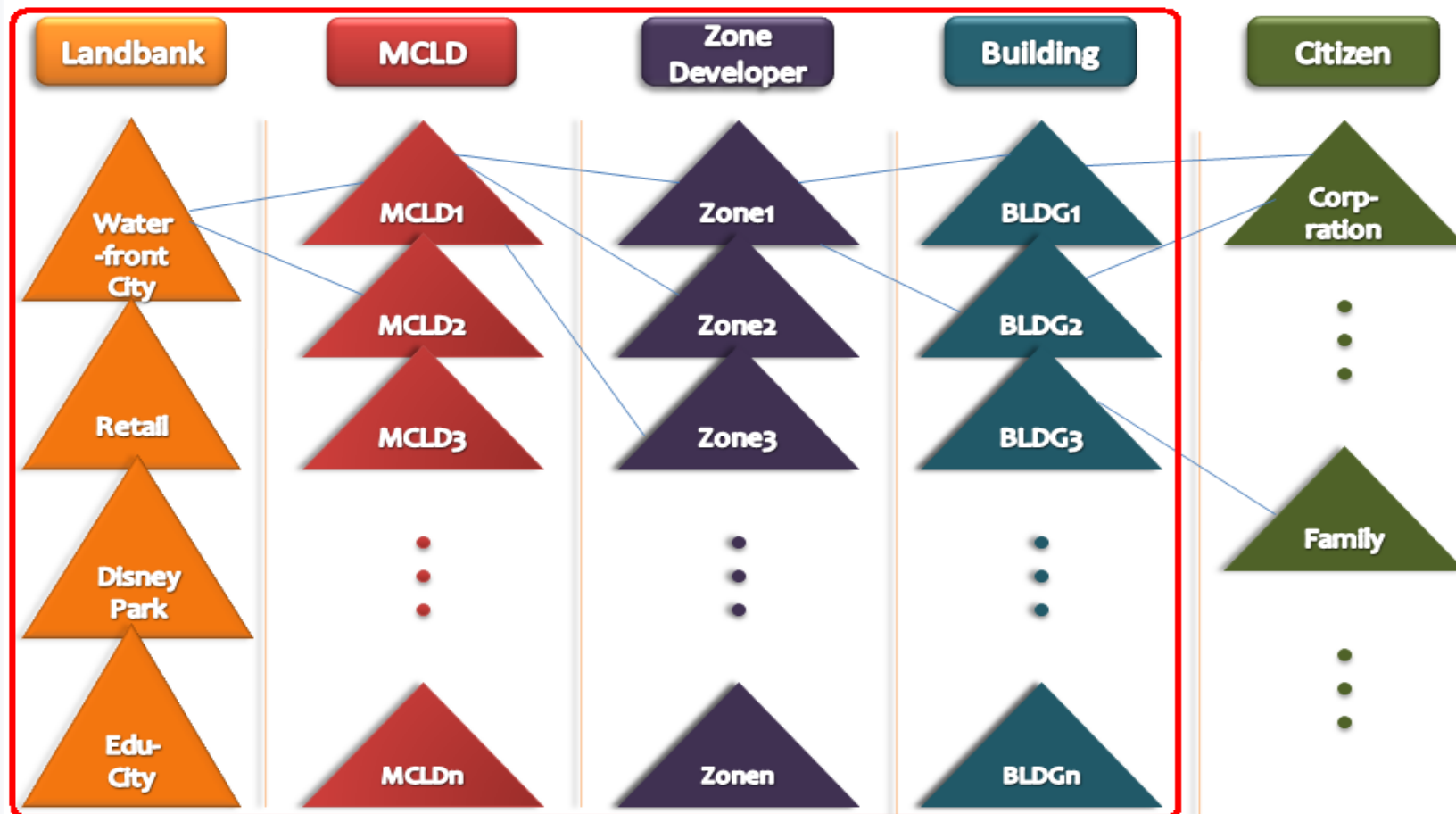
- To facilitate the **evaluation and selection of the Business Partners** based on Green SCM Concepts and Best Practices for the development of ISKANDAR Malaysia.
- To set up **Key Performance Indicators (KPIs)** for each business partner(s) at different levels to measure their business performance against Green SCM with the major focus on Carbon Management.
- To **optimize the capital costs on various clean technologies** during the development, in order to achieve Carbon Emission Reduction in the most cost-effective manner.



## Green Initiatives for ISKANDAR Malaysia

### Carbon Management as the Major Objective

#### Iskandar Malaysia Infrastructure

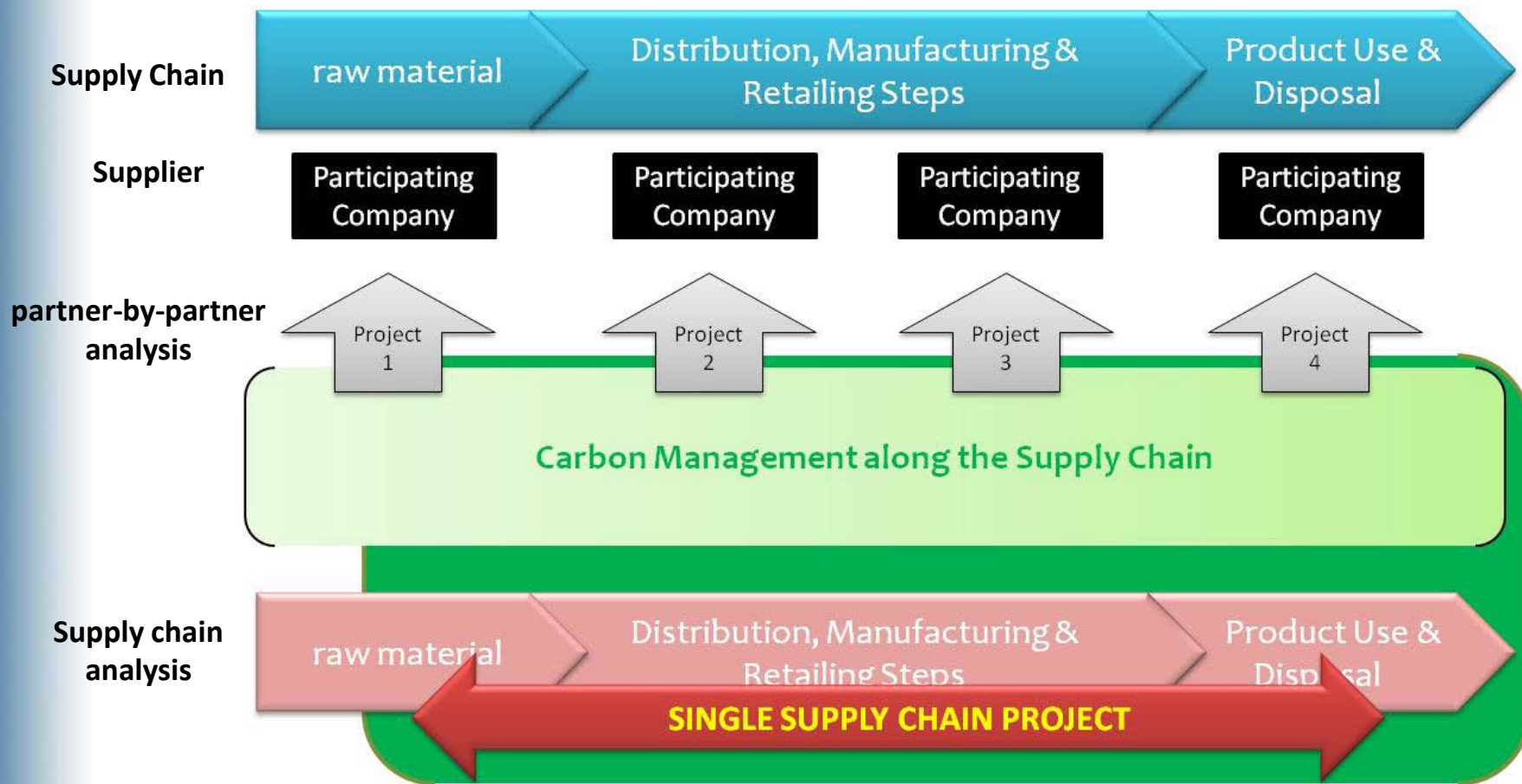


Red border shows the scope of this project



## Green Initiatives for ISKANDAR Malaysia

### Carbon Management as the Major Objective





## **Green Initiatives for ISKANDAR Malaysia**

### **Carbon Management as the Major Objective**

<b>Metric</b>	<b>Units</b>	<b>Basis</b>
<b>Carbon Emissions</b>	<i>Tons CO2 Equivalent</i>	This is the unit of measure currently used for green house gas emissions and is a measure of the climate impact from CO2 and other global warming air emissions.
<b>Air Pollutant Emissions</b>	<i>Tons or kg</i>	This would include emissions of major air pollutants( COx, NOx, SOx, Volatile Organic Compounds (VOC) and Particulate). These are the major emissions that U.S.EPA tracks.
<b>Liquid Waste Generated</b>	<i>Tons or kg</i>	This includes liquid waste that is either disposed of or released to open water or sewer systems( these emissions are generally listed on water emissions permits).
<b>Solid Waste Generated</b>	<i>Tons or kg</i>	The total solid waste generated by the process
<b>% Recycled waste</b>	<i>Percent</i>	The percent of the solid waste that is recycled.



## Green Initiatives for ISKANDAR Malaysia Carbon Management as the Major Objective



### **Business Partners Selection & Monitoring**

- To assess the **internal energy efficiency of business partners** and to support them in using less carbon-intensive fuels.
- To encourage partners to extend their efforts to cut costs and reduce carbon emissions throughout their supply chains.
- To develop **mandates and KPIs** in evaluating, selecting and negotiating with potential business partners.
- To drive partners in using or developing products that are made from more carbon-efficient raw materials and consume less energy and emit lower levels of greenhouse gases in operation.





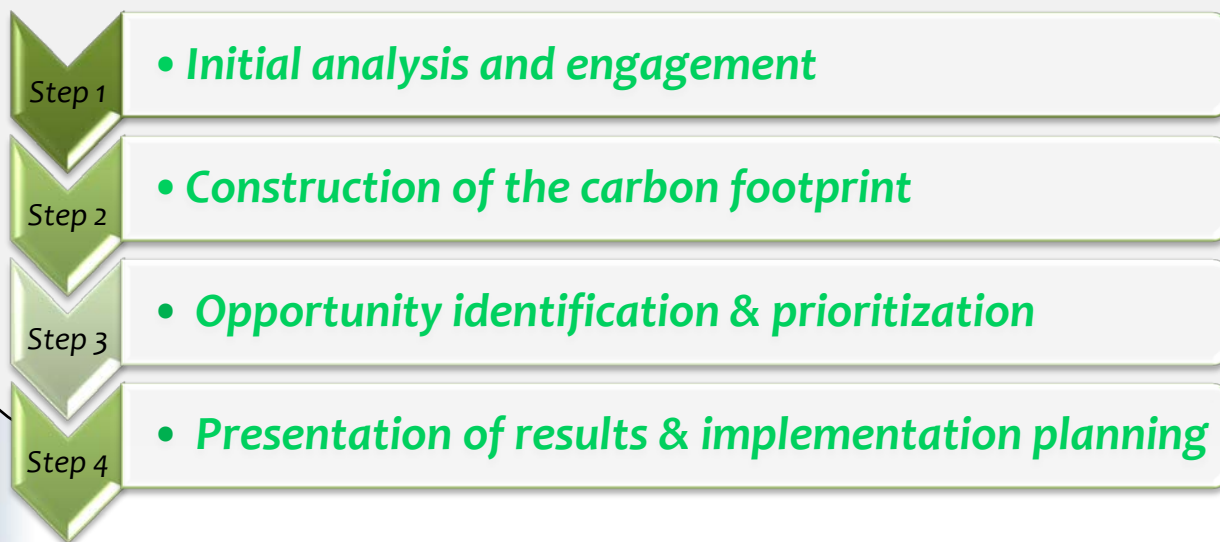
## Green Initiatives for ISKANDAR Malaysia

### Carbon Management as the Major Objective



### *Methodology for carbon management Life Cycle Analysis (LCA)*

- Identifying and quantifying the **environmental loads** involved – the energy and raw material used, and the emissions and wastes consequently released
- Assessing and evaluating the potential **environmental impacts** of these loads
- Assessing the opportunities available to bring about environmental improvements





## Green Initiatives for ISKANDAR Malaysia

### Tool for Green SCM – Optimizing Capital Costs

#### - Strategic Goals -

##### ➤ To leverage on expertise in:

- Building services
- Mechanical & civil engineering
- Sustainable energy systems

##### ➤ To optimize the solution in:

- Energy strategies
- Sustainable building design
- Optimal low-carbon operation





## **Green Initiatives for ISKANDAR Malaysia**

### **Tool for Green SCM – Optimizing Capital Costs**

## **Problem Statement**

### **❖ Objective:**

- *To optimize the mixed use of clean/renewable technologies to achieve 20% carbon emission reduction with the lowest capital cost*

### **❖ Expected Outcomes:**

- *A tool with a user-friendly interface for clean energy technology optimization and energy performance evaluation*
- *A scenario-based model that build on analyses of many facts and assumptions about supply, demand, and regulation in order to help executives make informed decisions on optimizing asset portfolios*



## Green Initiatives for ISKANDAR Malaysia

### Tool for Green SCM – Optimizing Capital Costs

**One or a mix of these technologies and a mathematical model:**

#### Clean, renewable energy:

- Photovoltaic (electricity) -PV
- Solar thermal (hot water) -ST
- Wind turbines (electricity) -W
- Biomass (heating) -BH
- Biomass CHP (heating and electricity) -BCHP
- Heat pumps (heating/cooling) -HP

**“Optimal mix” → Minimum capital cost**

Capital cost: linear combination of renewables' powers installed

$$Z = C_{PV}X_{PV} + C_{ST}X_{ST} + C_WX_W + C_{BH}X_{BH} + C_{BCHP}X_{BCHP} + C_{HP}X_{HP}$$

where:

$x_i$  = power output installed (kW) (decision variables);

$c_i$  = installation cost per kW installed (£);

The sizes of the installed powers ( $x_i$ ) are subject to several constraints that depend on the project under investigation.



## Green SCM for ISKANDAR Malaysia

### Carbon emission reduction & management



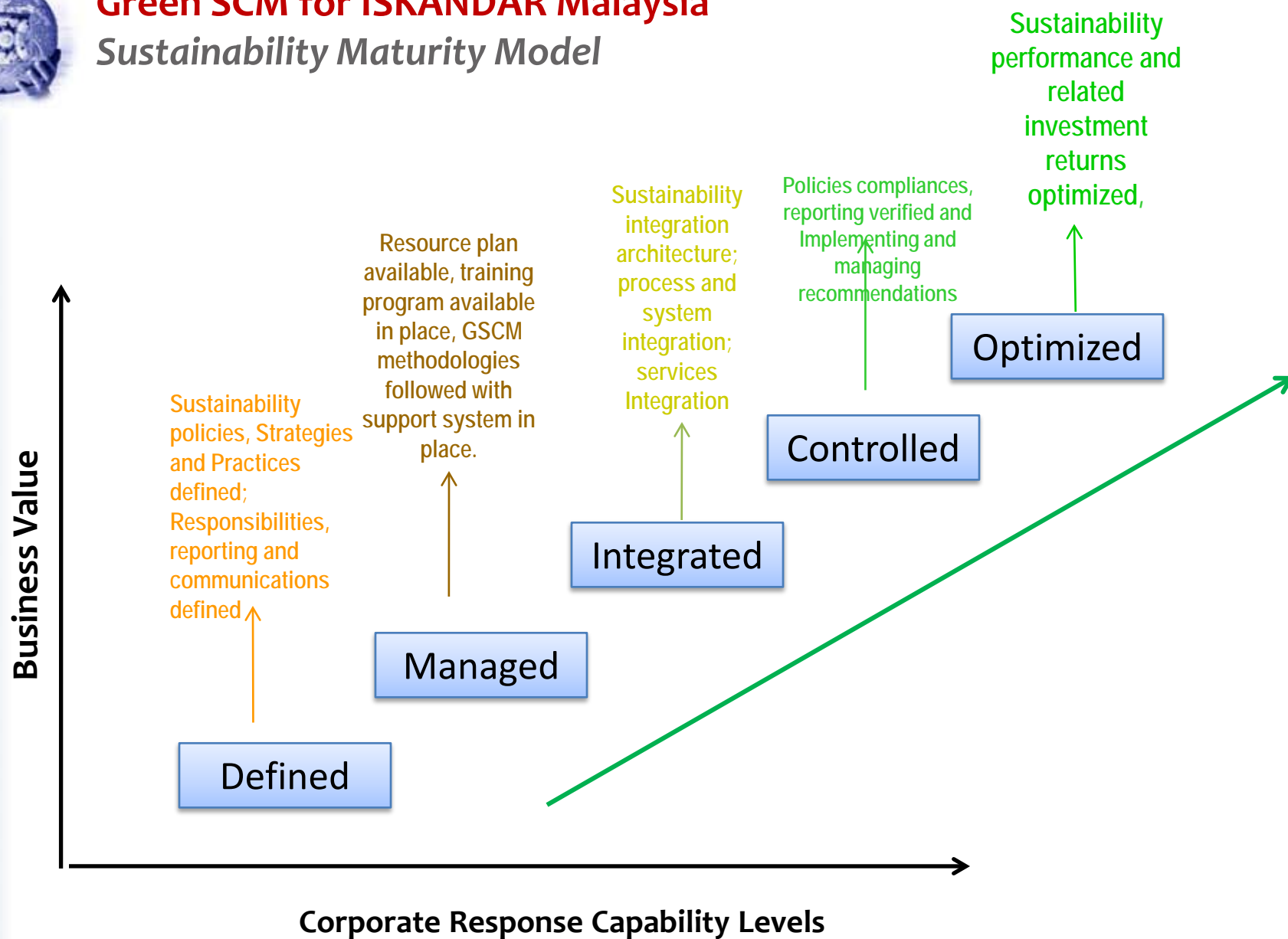
#### Significance and Benefits

- Moving to a more **carbon-constrained world**, business will have to meet **customer needs** in a way that generates fewer carbon emissions.
- **Business energy efficiency** has played, and will continue to play, an important role but more fundamental solutions are also needed.
- **The supply chain approach has the potential to find significant emission reduction opportunities and large financial benefits by reducing the carbon footprint along the entire supply chain.**
  - Build a picture of the carbon footprint of each product by measuring life-cycle emissions across the entire supply chain
  - Identified large emission sources both within their own operations and across the activities of other companies operating in the supply chain
  - Developed and prioritized opportunities that will reduce emissions, cut costs and create new commercial opportunities



# Green SCM for ISKANDAR Malaysia

## Sustainability Maturity Model







[www.icognitive.com](http://www.icognitive.com)

[john.paul@icognitive.com](mailto:john.paul@icognitive.com)

[catherine.hoyez@icognitive.com](mailto:catherine.hoyez@icognitive.com)



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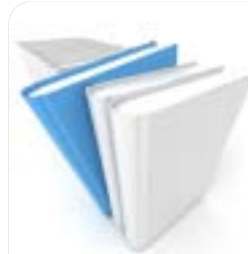
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**Design supply chain strategy**



**Benchmarking**



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**[www.iCognitive.com](http://www.iCognitive.com)**

**iCognitive Singapore (Main)**

13A Ann Siang Road  
Singapore 069693  
Tel : +65 63252810  
Fax : +65 62200690

**iCognitive Europe**

7 C, place du Dôme  
Immeuble Elysées La Défense  
92056 Paris La Défense  
France  
Tel : +33 (0)172757230  
Fax : +33 (0)172757299

**iCognitive China**

Room 101- 201, B unit, 3rd building  
No.4028 Nan Huan Road  
Hangzhou P.C 310053  
China (PRC)

**iCognitive Central**

10th Floor, Wisma Havela Thakardas  
No.1, Jalan Tiong Nam, Off Jalan Raja  
Laut  
50350 Kuala Lumpur  
Kuala Lumpur  
Malaysia