Greenhouse Gas Management – A Contractor's Perspective

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Seminar on Greenhouse Gas Validation and Verification
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Gammon Construction

- Engineering & Construction
- Operating in Hong Kong, Singapore and SE Asia
- Annual turnover US $1.5 bn
- 1958 established in HK
- Shareholders are Balfour Beatty and Jardine Matheson

Sustainability Report
http://www.gammonconstruction.com/en/html/sustainability/report.html

Sustainability Action Plan

Guided by our Roadmap, we are moving from setting year-on-year objectives and targets towards multi-year targets that span all four pillars of our sustainability framework. These have been integrated into our business planning objectives and strategies at the board level.

Delivering Value

- To take up the leadership challenge
- Public commitment to environmental management and sustainability

What We Believe?

Sustainability Perspective

Safety

Money

Time

Quality

Resources

Environment & Society

Safety

Money

Time

Quality

Resources

Environment & Society

Identify the real Incentives

Business Drivers for GHG / Carbon Management

Corporation Social Responsibility – to develop business in a sustainable way and limit the impact on the environment

Cost Saving – by reducing carbon emission, fossil energy consumption can be reduced and reduce regulatory cost such as carbon tax, if any

Brand Value – going green is now seen as a brand asset

Competitive Advantage – increasing shareholders/customers' demand for demonstrable carbon accounting and saving activities

Major Stakeholders' Initiative

Development Bureau - Baseline Carbon Assessment for the Construction Process of Public & Private Works Projects

ArchSD – Life Cycle Energy Analysis Tool

EMSD - Life Cycle Energy Assessment of Building Construction

CEDD/GEO – Development of carbon audit methodology for typical geotechnical works

HKHA – Carbon Emission Estimation (CEE) Tool

EPD - Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for buildings (Commercial, Residential or Institutional Purpose)

MTRC – Carbon Study on Railway System, SCL project and new train

HK Exchange - Environmental, Social and Governance (ESG) reporting guide (KPI B1.2 – greenhouse emission)

Construction Industry Council (CIC) – Establishing Hong Kong Based Carbon Labeling Framework for Construction Materials

BEAM Plus or CEEQUAL Credits

BEAM Plus

Section 4 – Energy Use

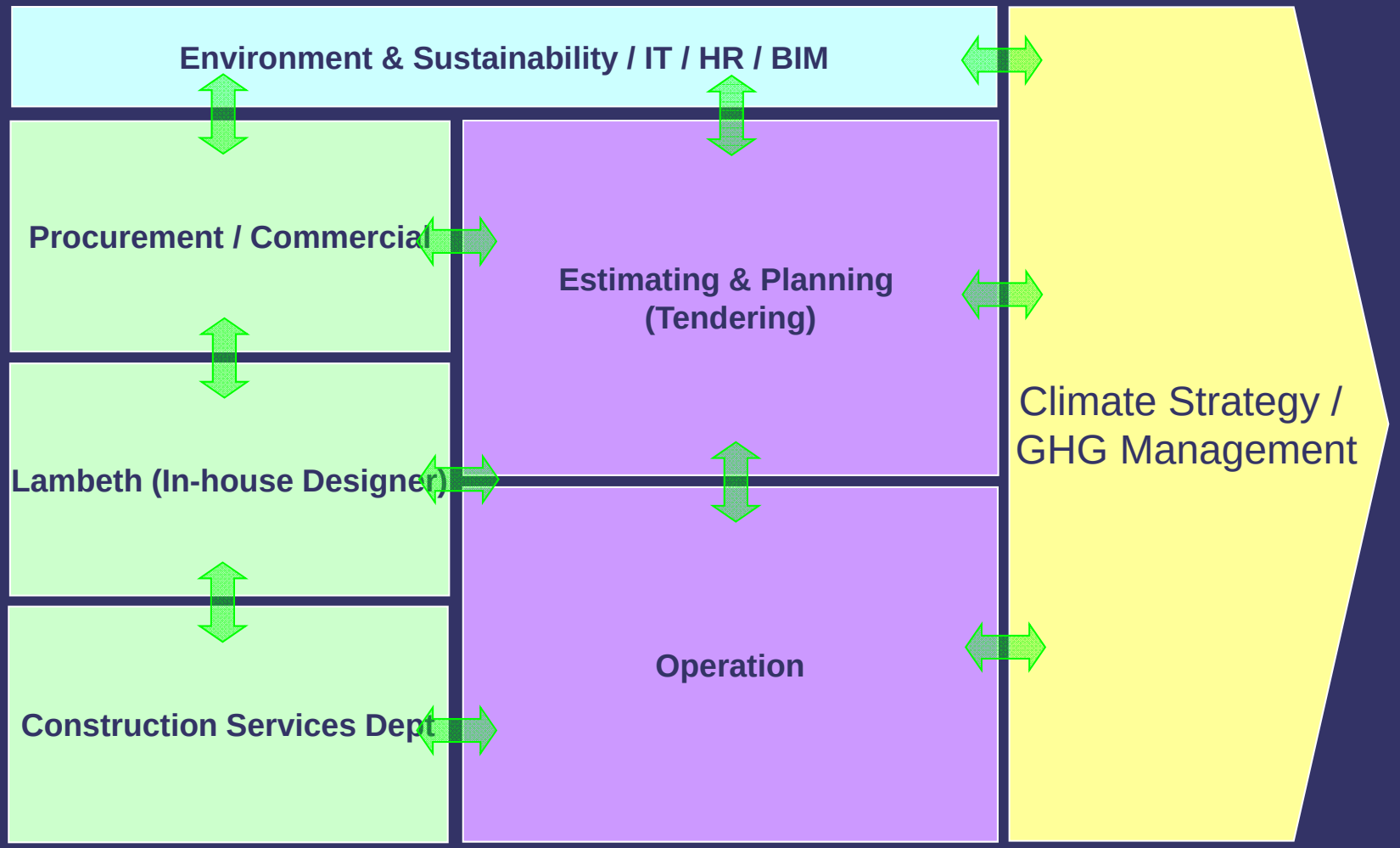
CEEQUAL

Section 8.4 – Design for reduced energy consumption and carbon emissions in use

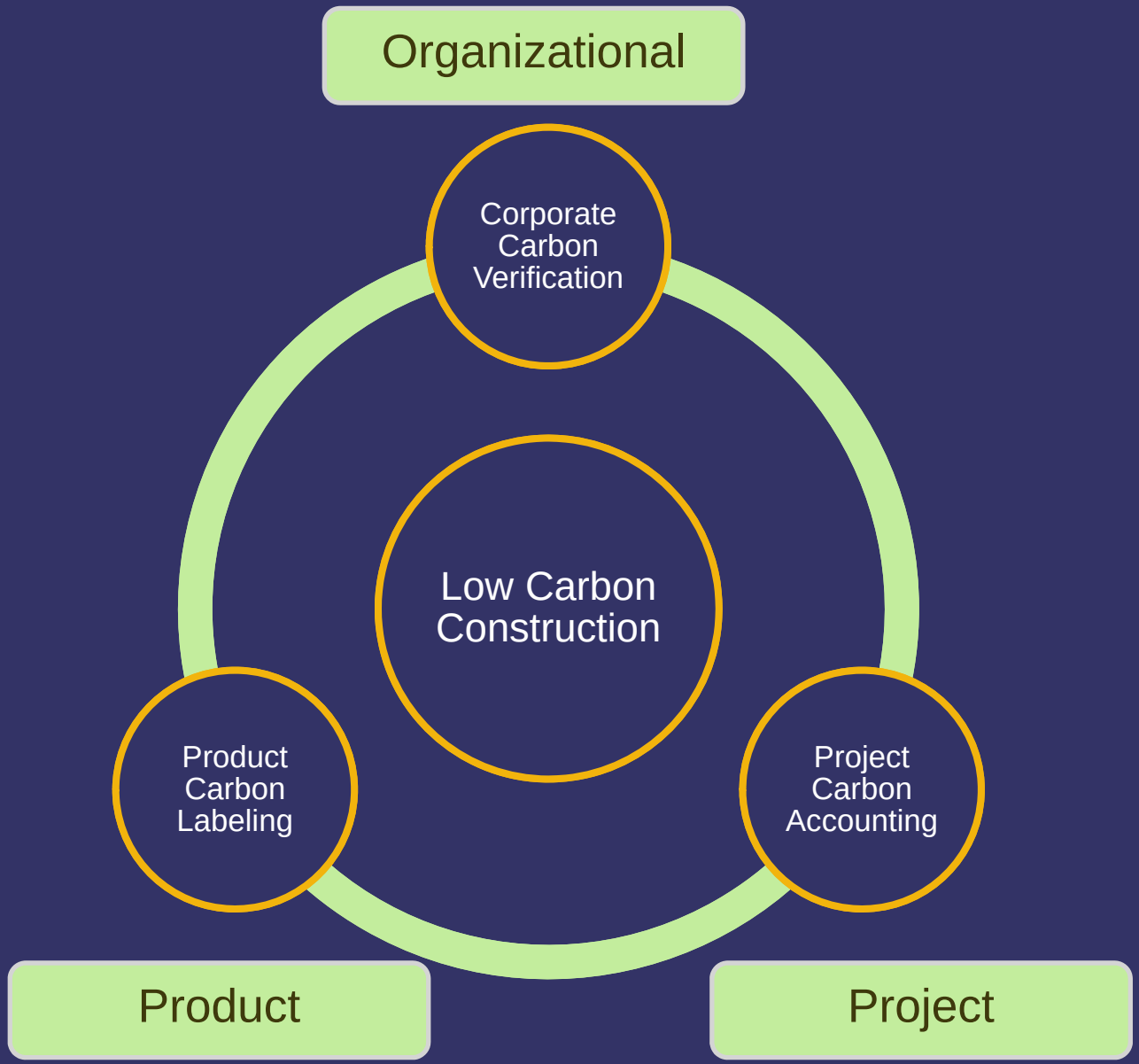
Section 8.5 – Energy and carbon performance on site

Gammon Approach

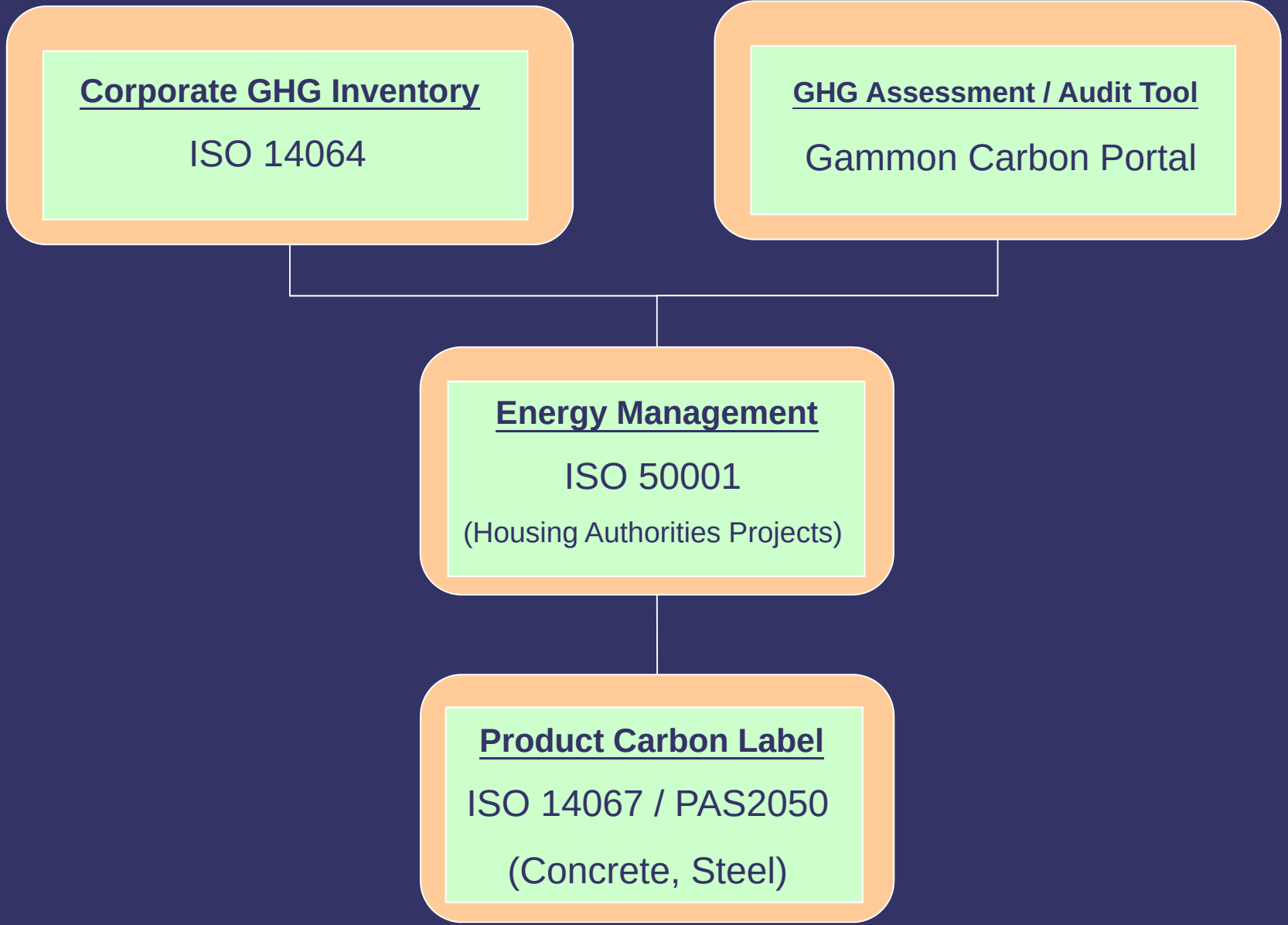
Synergy – Carbon Taskforce



GHG Management



GHG Management



Corporate Accounting and Reporting

Tracking Environmental Performance as well as Greenhouse Gas (GHG) Data since 2003

Took 10 years to build up confidence to seek for independent verification by 3rd party on GHG accounting and reporting in accordance with ISO14064

Verification Statement was issued on 15 March 2013

Why ISO 14064?

You Can't Manage

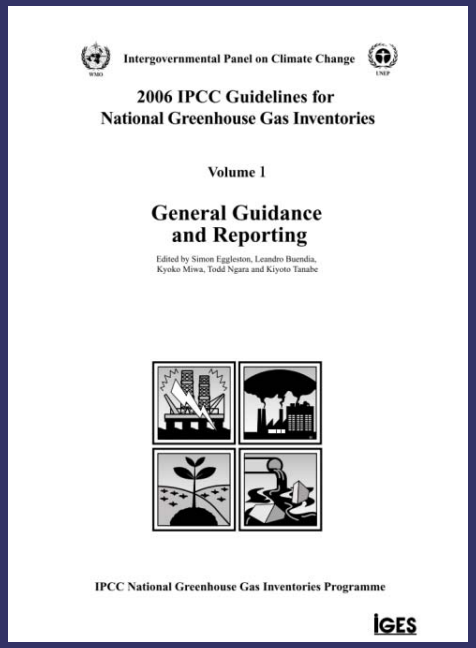
What

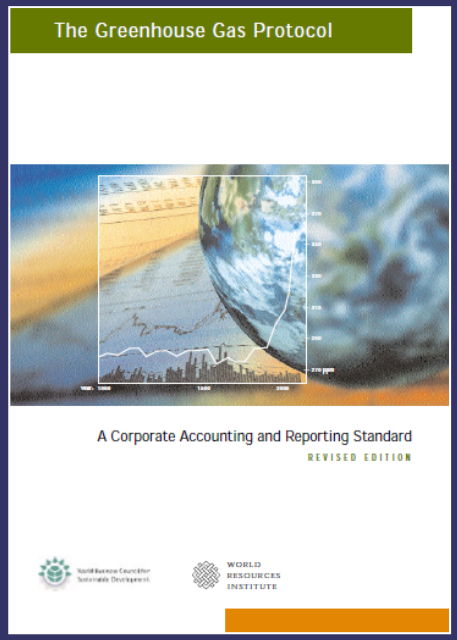
You Don't Measure

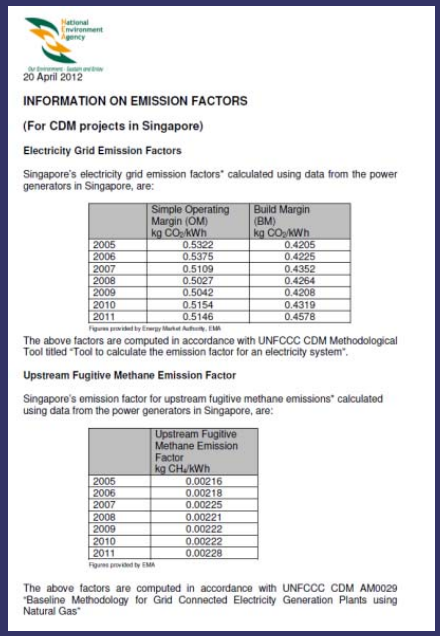
Scope & Organizational Boundary

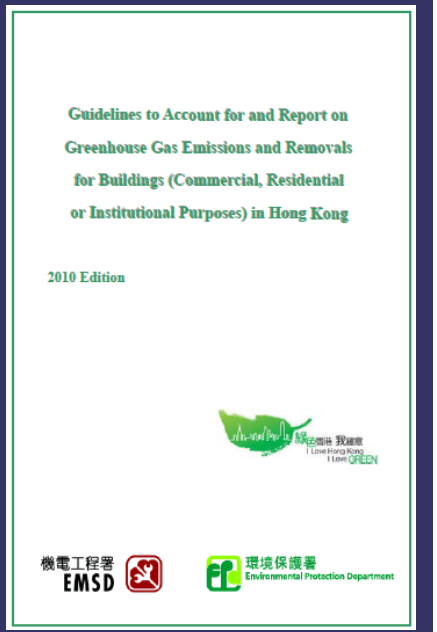
	Scope 3 - Upstream		Scope 1 & 2		Scope 3 - Downstream
	Permanent/Temporary Design & Planning Materials Selection, Purchasing	Labor/Plant/ Materials Delivery	Construction		Offsite Disposal
	Concrete Mix Design & Planning Materials Selection, Purchasing	Raw Materials Delivery	Concrete Production	Concrete Supply	Concrete Pouring
	Structural Steel Design & Planning Materials Selection, Purchasing	Raw Materials Delivery	Steel Fabrication	Fabricated Product Supply	Erection / Installation of Fabricated Product
	Construction Plant Assessment & Planning Plant Selection, Purchasing	Plant Delivery	Plant Maintenance	Plant Supply	Plant Operation
	Office Selection and Rental	Staff Commuting (Home to Office)	Office Operation		Staff Commuting (Office to Home)

References and Guidelines





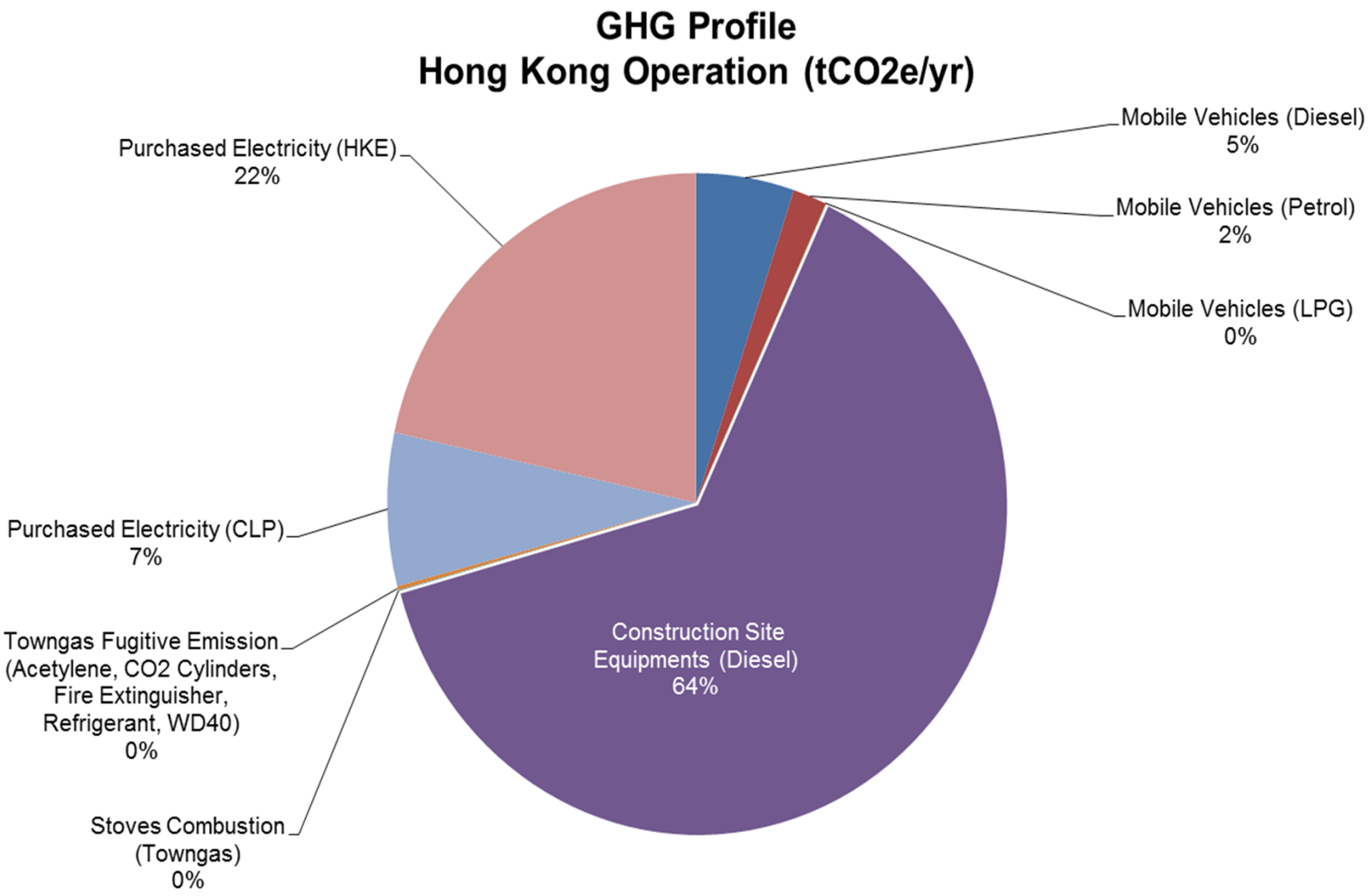




- 2011 PowerAssets Sustainability Report
- 2011 CLP Sustainability Report
- NDRC
- 2011 Singapore Electricity Grid Emission Factors
- IPCC 2006
- Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Building (Commercial, Residential or Institutional Purposes) in Hong Kong - EPD/EMSD.

GHG Profile – HK Operation

- ISO 14064 verified



Verified Overall GHG Profile Summary and Lesson Learnt

Emission categories	Percentage
Fuel (Diesel, Petrol, LPG, Towngas)	69%
Purchased Electricity	30%
Fugitive Emission (Acetylene, CO2 Cylinders, Fire Extinguisher, Refrigerant, WD40, Septic Tank)	0.30%

- Most time consuming on collecting Fugitive Emission data.
- Best to rely on statements cleared by accounting department for Electricity and Fuel consumption.
- Isolation of sole supplier on specific products (i.e Fire extinguisher, Acetylene) would accelerate the verification process.
- Reduction in Fuel consumption would see the most impact.

CIC Carbon Labeling Scheme

Aim: Provide verifiable and reliable information on the carbon footprint of construction products for users to make informed decision thereby to reduce carbon footprint of developments.

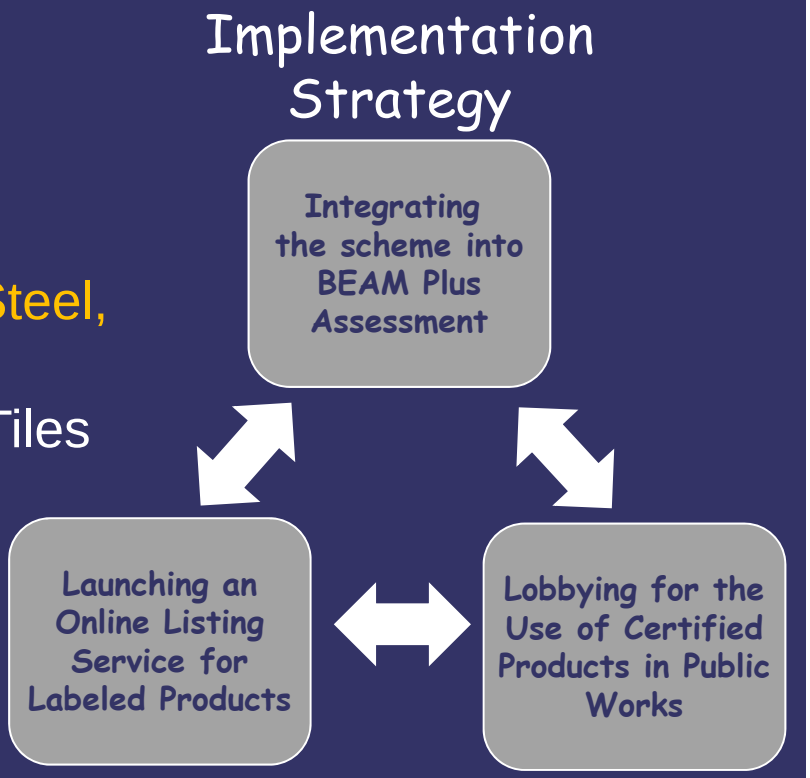
Current Coverage

Phase 1 - Cement, Rebar and Structural Steel, Concrete

Phase 2 - Aluminum, Glass and Ceramic Tiles

Launch Prototype Stage of Scheme in Nov 2013

Open for Application in Dec 2013



Carbon Foot-printing of Gammon Green Concrete

	Scope 3 - Upstream		Scope 1 & 2		Scope 3 - Downstream
	Permanent/Temporary Design & Planning Materials Selection, Purchasing	Construction Materials Delivery	Construction		Offsite Disposal
	Concrete Mix Design & Planning Materials Selection, Purchasing	Raw Materials Delivery	Concrete Production	Concrete Supply	Concrete Pouring

Remarks: Material Aspect | Transportation Aspect | Process Aspect

Independent Verification

Standard – PAS2050 Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

Covered Concrete Products

- Normal concrete mixes (for general purpose applications)
- High-performance concrete mixes including:
  - Flowing Concrete (Slump over 190mm)
  - Tremie Concrete
  - Very Long Slump Retention Concrete (Slump retention over 10 hours)
  - Early Strength Concrete (Cube Strength over 10MPa in 12 hours)
  - Very Early Strength Concrete (Cube Strength over 12MPa in 4 hours)
  - High-Strength Concrete (Ranged from G65 to G100MPa with high workability)
  - Self-Consolidating Concrete (Slump flow over 600mm)
  - Crack Control Concrete
  - Architectural Concrete

Target to obtain Verification Statement in December 2013 and prepare for applying CIC Carbon Label

HKCA Practical Guide on Carbon Reduction (Temp Works)

Launched on 11 Nov 2013

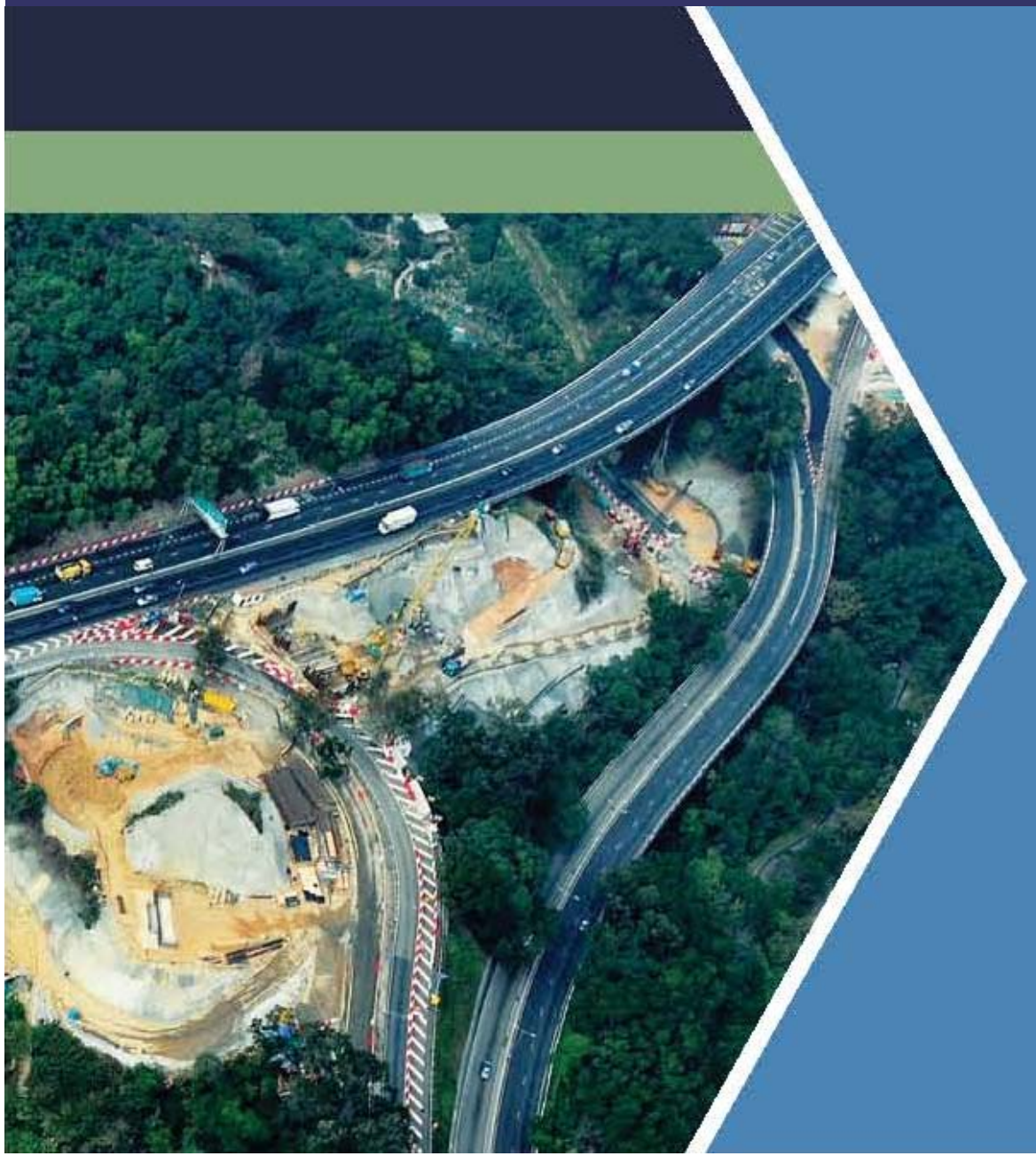
About the guide

- Guide produced to provide guidance to identify and reduce carbon and other GHG emissions in temporary works
- Focus on temporary works as Construction Industry has a large influence in this area
- Includes a tool to estimate the carbon emissions for different temporary works options (types / materials / plant / transport)

Covered Types of Temp Works

- Formwork/falsework
- Earthwork support
- Cranage
- Hoarding

Carbon Smart Design and Construction



Project savings

Less steel
Total steel and rebar savings
= 12,112 tonnes

Less concrete
35,924 cubic metres
(5,132 truckloads of concrete)

Less spoil removed
Total project savings
81,865 tonnes

Trees saved
2,585

Modularization / Prefabrication

Vs

Carbon Saving in Green Materials

- Sustainable Timber (95% starting 2012)

- Bio-diesel (70% in 2014)

Carbon Saving in Green Materials

- Steel (Regional / Recycled)
- Cement (Regional / Life-cycle)
- Gammon Concrete (Regional / Life-cycle)

Thank You