GREEN COUNCIL
環保促進會

Webinar:
Climate Change Mitigation: Decarbonisation Technology and Innovation - What To Know and Do About it

Application of information technology to decarbonise your organisation

Mr. Paul Fraley
Managing Director
Tel-e-Biz

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Webinar on
Climate Change Mitigation:
Decarbonisation Technology and Innovation – What to Know and Do About it

Application of Information Technology to decarbonise your Organisation

Paul Fraley

22nd September 2022

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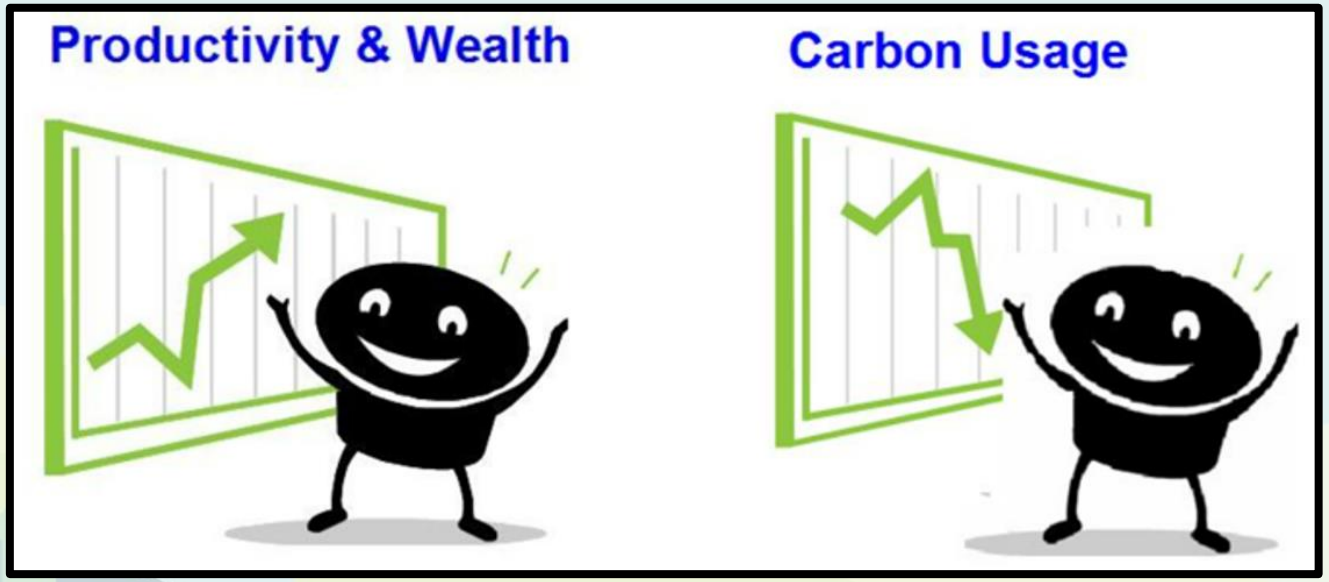
Topics



1. **Definitions**
   i. Decarbonisation
   ii. Net Zero CO2 Emissions
   iii. GHG Emission Scopes
   iv. Information Technology
2. **Digital Decarbonisation Areas**
3. **Smart Hong Kong Applications** (Local & International Experience)
4. **Not too distant Future**
5. **Potential Opportunities**

Decarbonisation

Decarbonisation refers to all measures through which a business sector, or an entity – a government, an Organisation – **reduces** its **carbon footprint**, primarily its **greenhouse gas emissions**, carbon dioxide (CO_2) and methane (CH_4), in order to **reduce its impact on the climate.**

Net-zero carbon dioxide (CO2) emissions

Net-zero carbon dioxide (CO2) emissions are achieved when anthropogenic CO2 emissions are **balanced globally** by anthropogenic CO2 removals over a specified period.

Intergovernmental Panel on Climate Change

GHG Emission Scope 1,2 & 3

KYOTO GREENHOUSE GASES

CO_2 SF_6 CH_4 N_2O HFCs PFCs

GHG Scope 1 & 2

Year 2021

	GHG EMISSIONS		
	Scope 1 (t CO2-e)	Scope 2 (tCO2-e)	Total Scope 1 & 2 (t CO2-e)
Corporation	200,248,928.02	96,668.20	209,313,140.79
Facility	85,820,987.99	41,429.23	89,705,651.46
Total	286,069,916.01	138,097.44	299,018,792.24

Scope 2*

The release of green-house gas as a result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that *do not* form part of the facility.

Scope 1*

The release of greenhouse gas into the atmosphere as a direct result of an activity, or series of activities (including ancillary activities) that constitute the facility.

Scope 3

Emissions that occur outside the boundary of a facility as a result of activities at a facility and are not scope 2 emissions.

Mandatory to report under NGERS

Not mandatory to report under NGERS

Information Technology & Digital Transformation

Information technology (IT) - is the use of any computers, storage, networking and other physical devices, infrastructure and processes to **create, process, store, secure** and **exchange all forms of electronic data.**

Digital transformation is the process of using **digital technologies** to create new — or modify existing — business processes, culture, and customer experiences to meet changing business and market requirements. This **reimagining** of business in the **digital age** is digital transformation.

People do what you inspect not what you expect

If you can monitor it you can manage it

Measure what matters

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Google Search Trends – Industrial and Business

Interest over time

[Decarbonisation, Net Zero CO2 Emissions - Explore - Google Trends]

Decarbonisation
Search term

Net Zero CO2 Emissions
Search term

100
75
50
25

Note

Average

Sep 17, 20...

Jun 9, 2019

Feb 28, 2021

Compared breakdown by region

Region

Decarbonisation Net Zero CO2 Emissions

Color intensity represents percentage of searches LEARN MORE

Sort: Interest for Decarbonisation

1	Singapore	
2	United Kingdom	
3	Hong Kong	
4	New Zealand	
5	Ireland	

Green House Gas Emissions Reporting

The following tables summarise greenhouse gas emissions and energy data for this facility during the reporting period.

GHG EMISSIONS			ENERGY	
Scope 1 ($t CO_2$-e)	Scope 2 ($t CO_2$-e)	Total of Scope 1 and Scope 2 ($t CO_2$-e)	Energy Consumed (GJ)	Energy Produced (GJ)
151,847	890	152,737	2,086,100	1,800,000

GHG Scope 1 Emission By Gas ($t CO_2$-e)						
CO_2 Carbon dioxide	CH_4 Methane	NO_2 Nitrous oxide	Perfluorocarbon CF_4 Tetrafluoro methane	Perfluorocarbon C_2F_6 Hexafluoro ethane	SF_6 Sulphur hexafluoride	HFCs Hydro fluorocarbons
151,454	104	289	0	0	0	0

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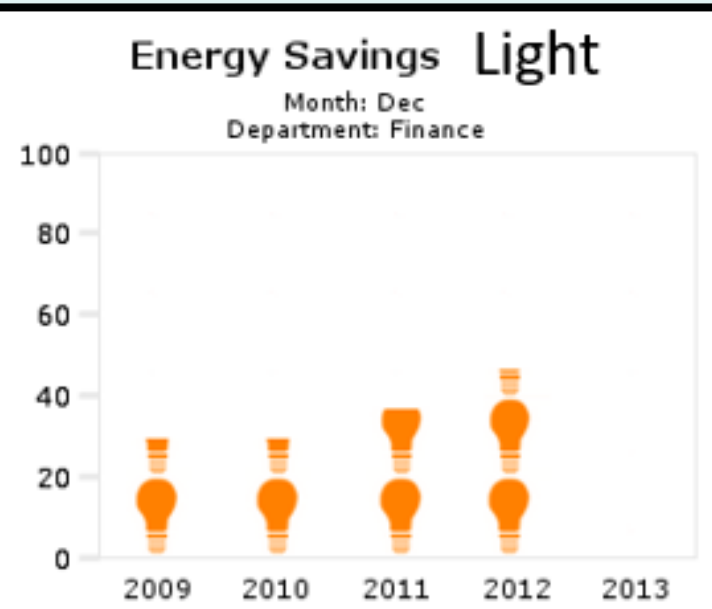
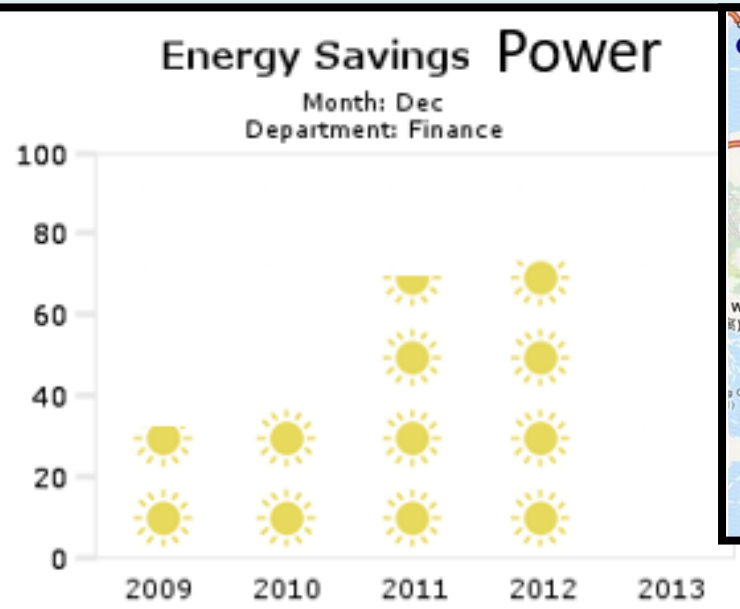
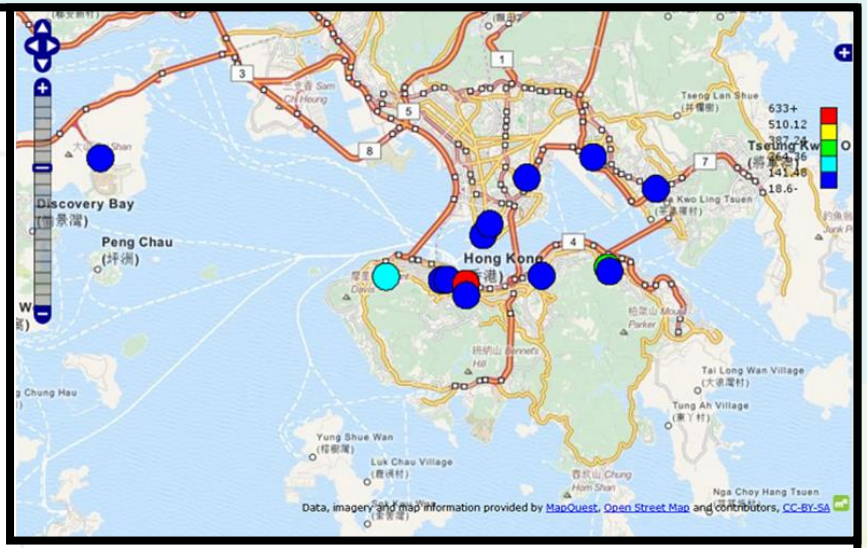
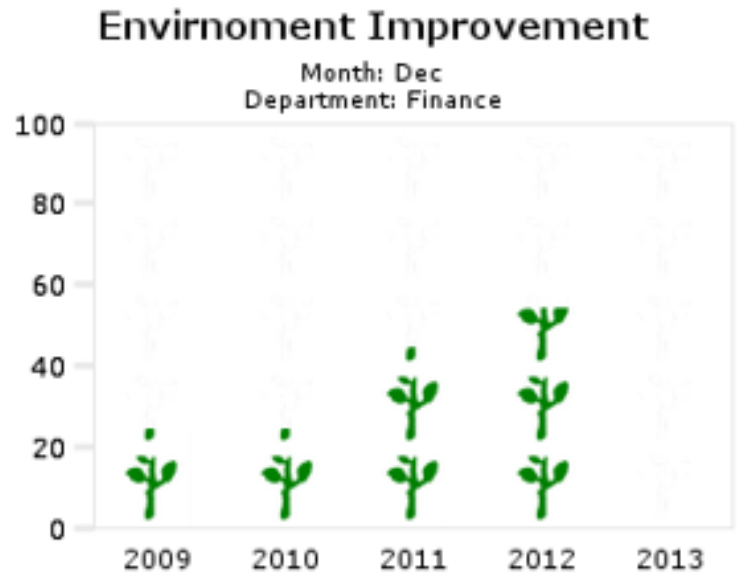
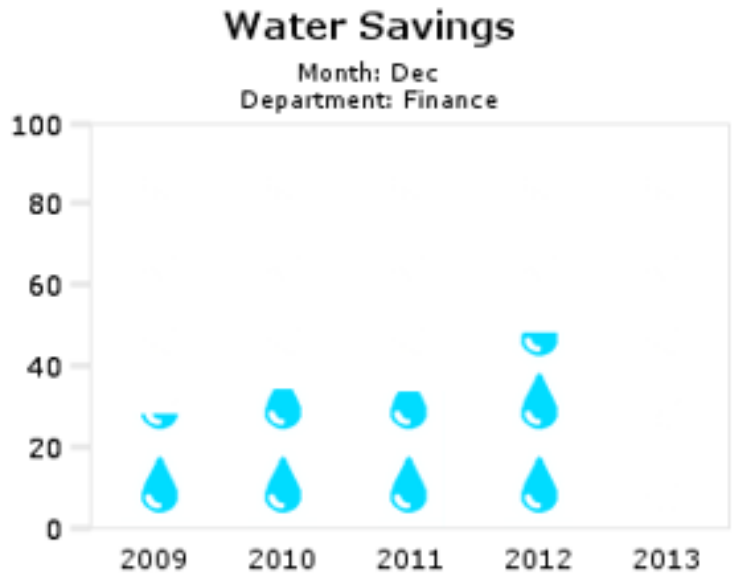
Sustainability Dashboard – KPIs











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Digital Decarbonisation Areas

Carbon Management

Smart City

Sustainability

BAQM

Carbon Measurement

Smart Meters

Carbon Management

- ✓ Electricity Consumption by Year
- ✓ CO2 and Electricity by Month
- ✓ CO2 and Electricity by Department
- ✓ Rolling 12 Months Values
- ✓ Rolling 12 Month Averages

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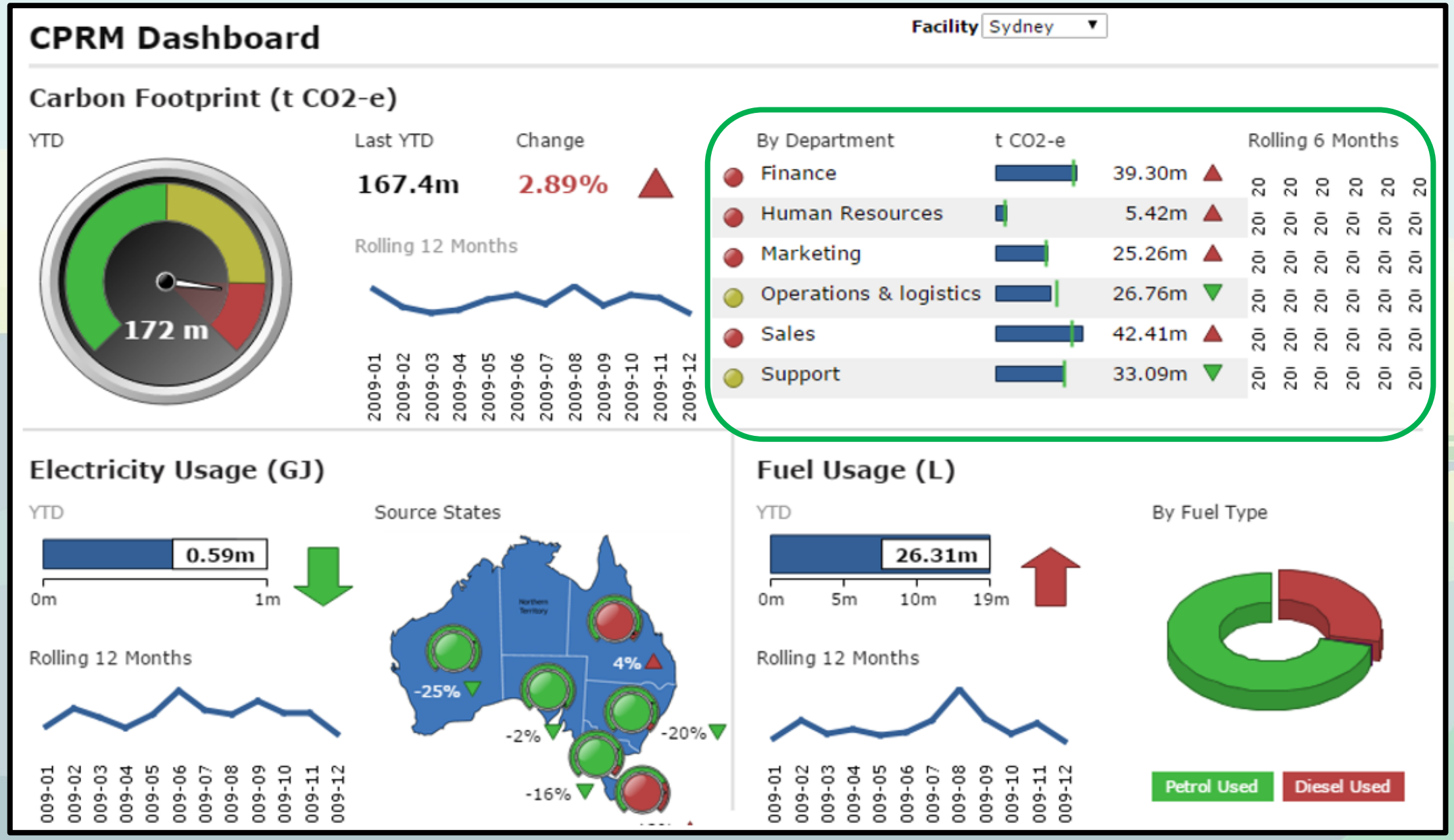
Eco Intelligence



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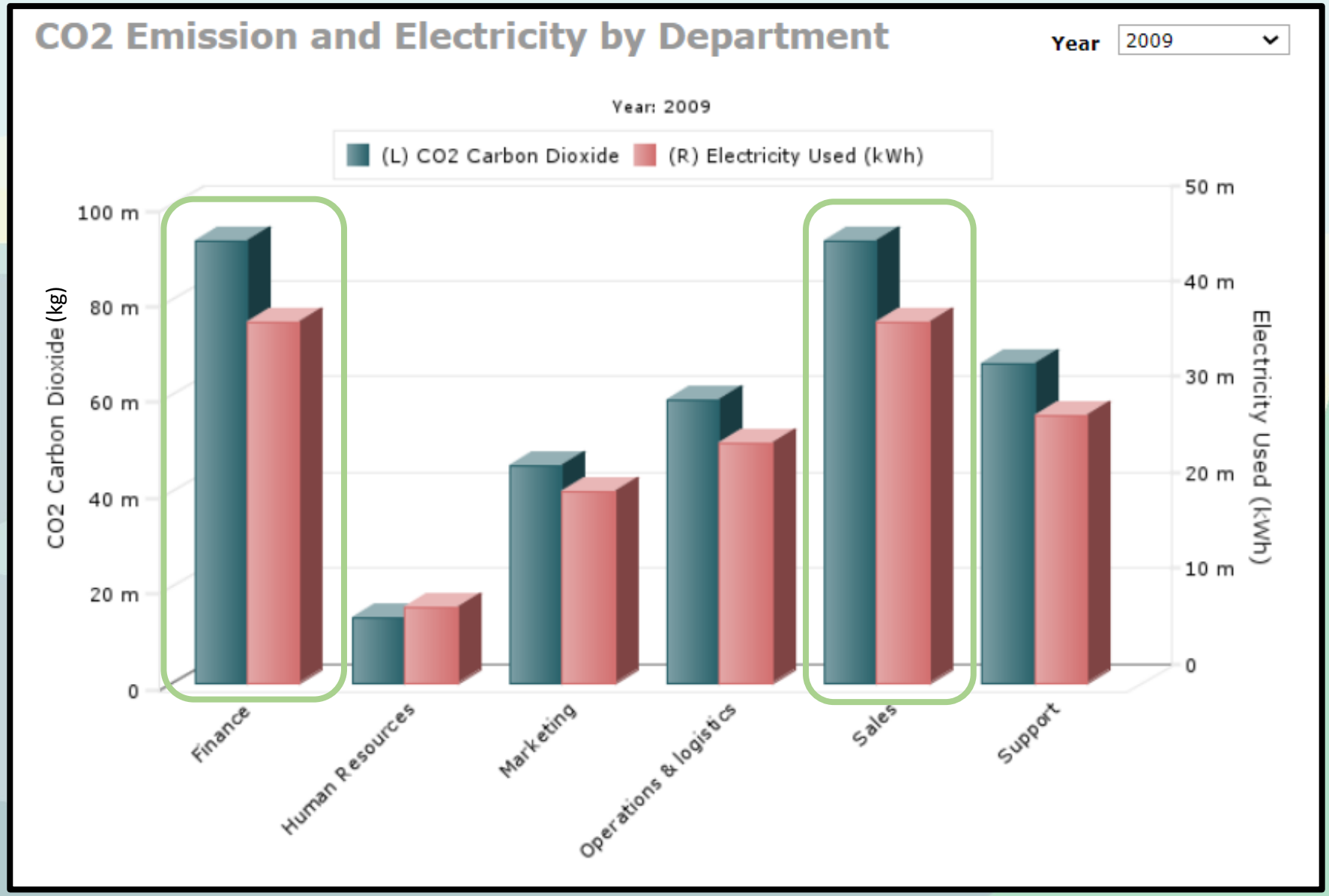
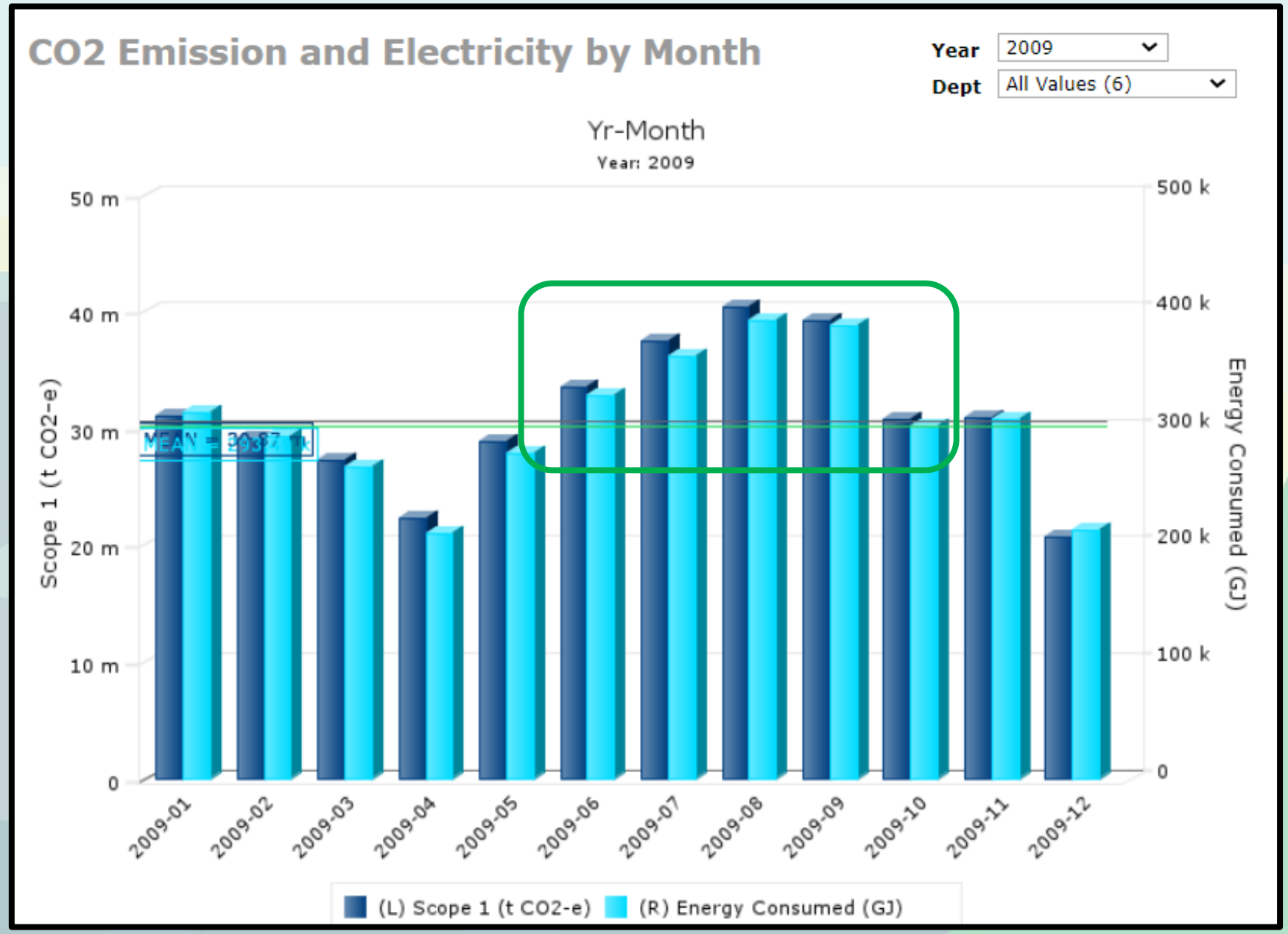
Digital Decarbonisation Assessment



Digital Decarbonisation Assessment



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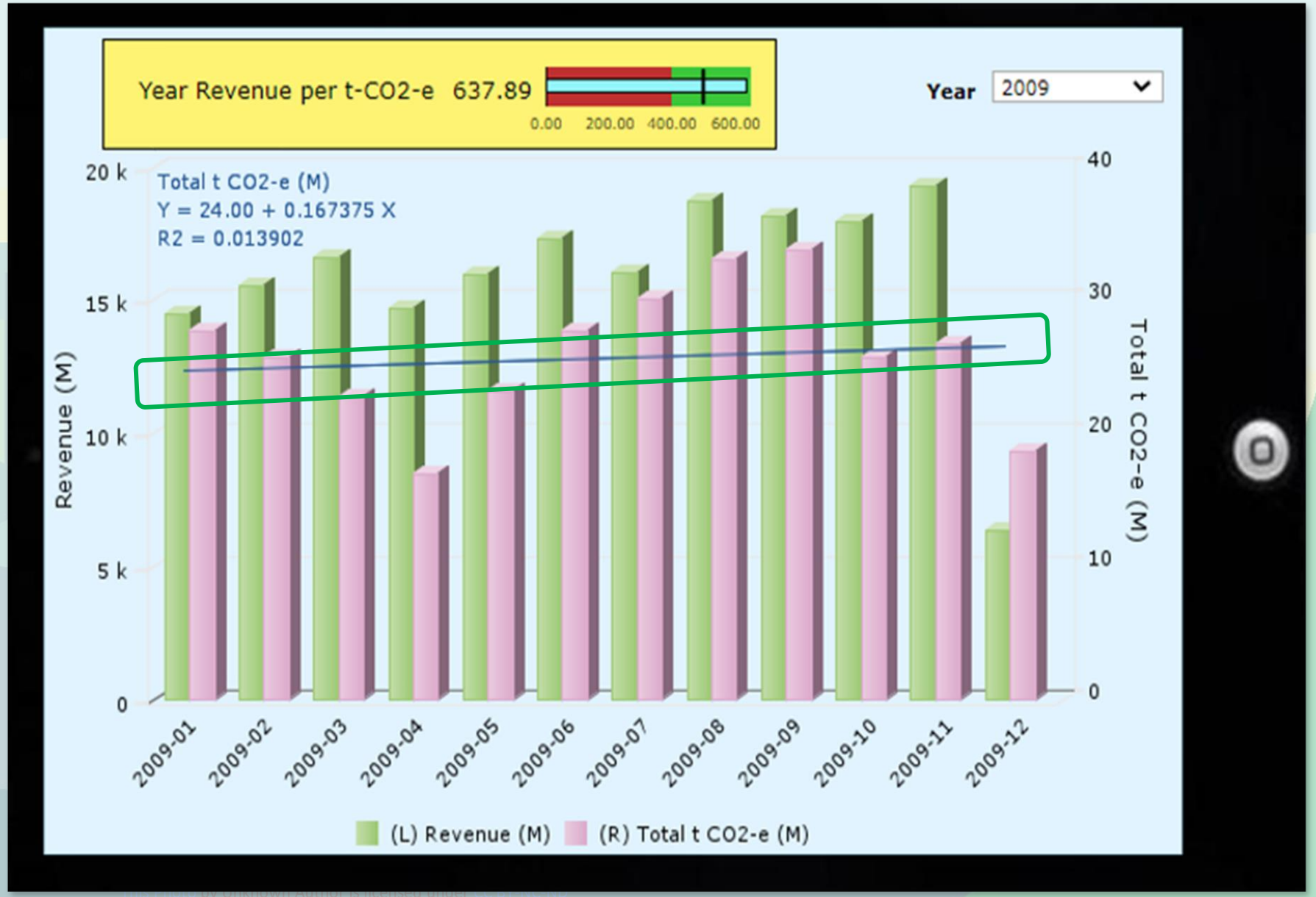
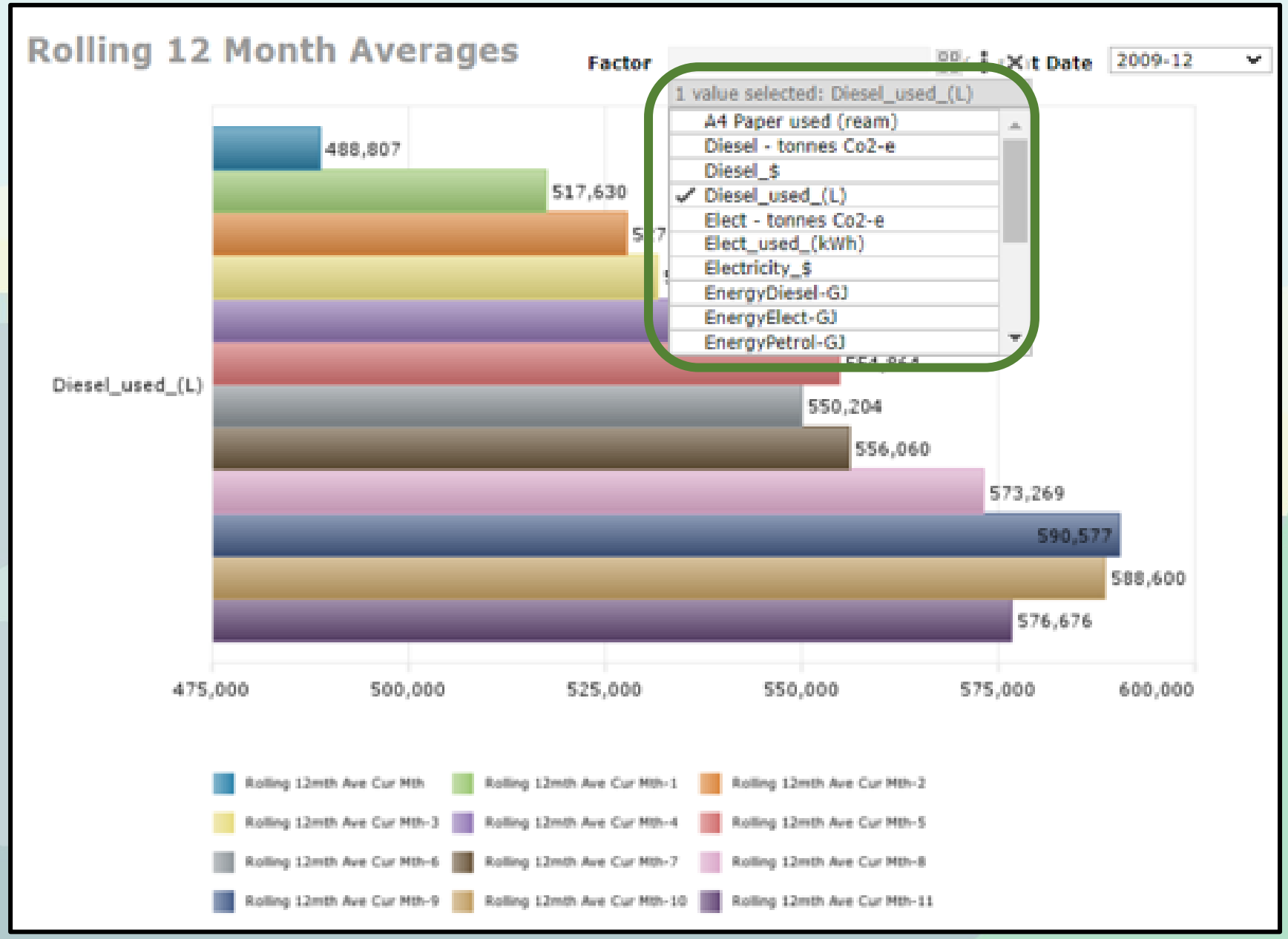
Digital Decarbonisation Assessment

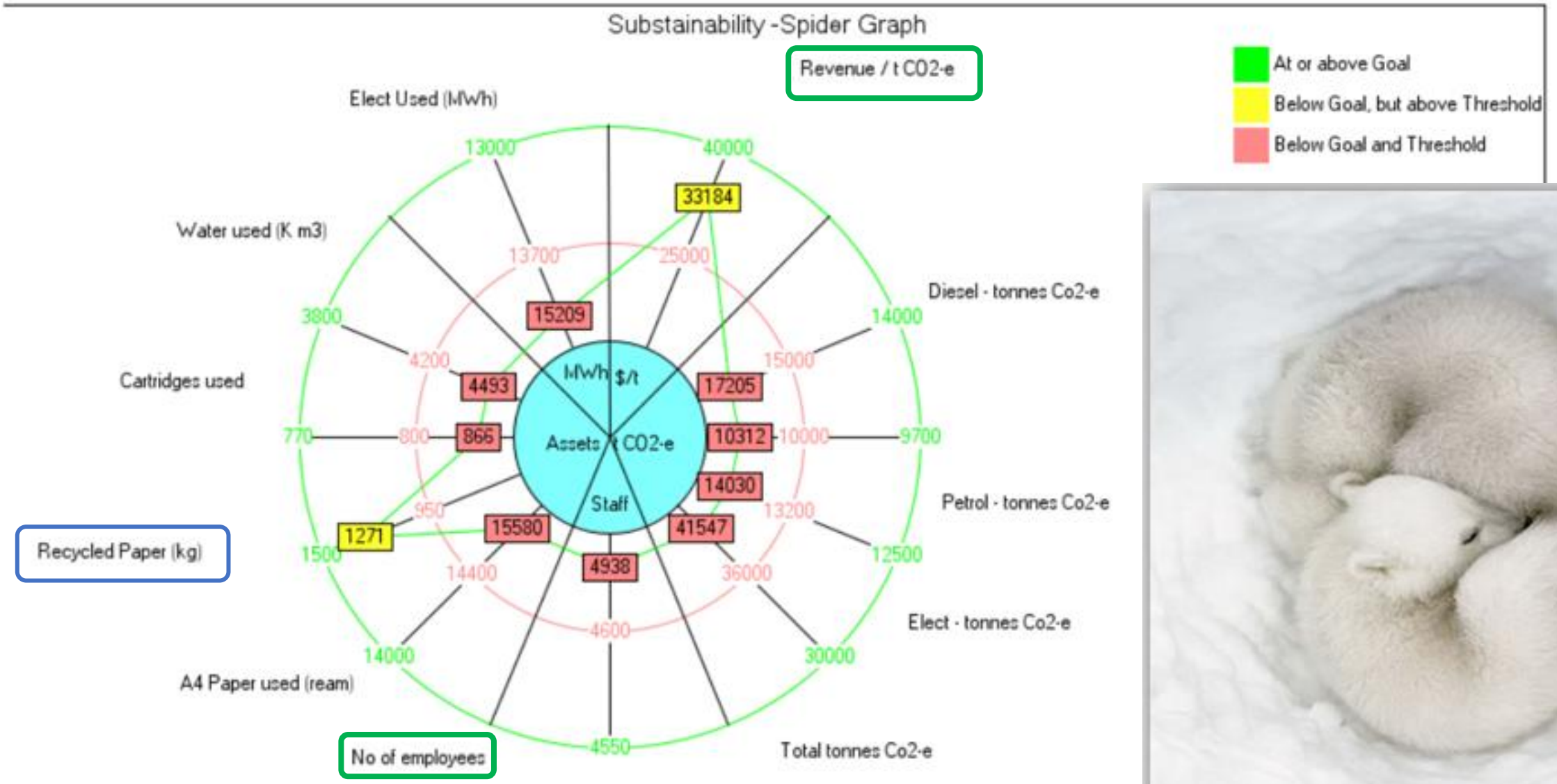


Digital Decarbonisation Assessment



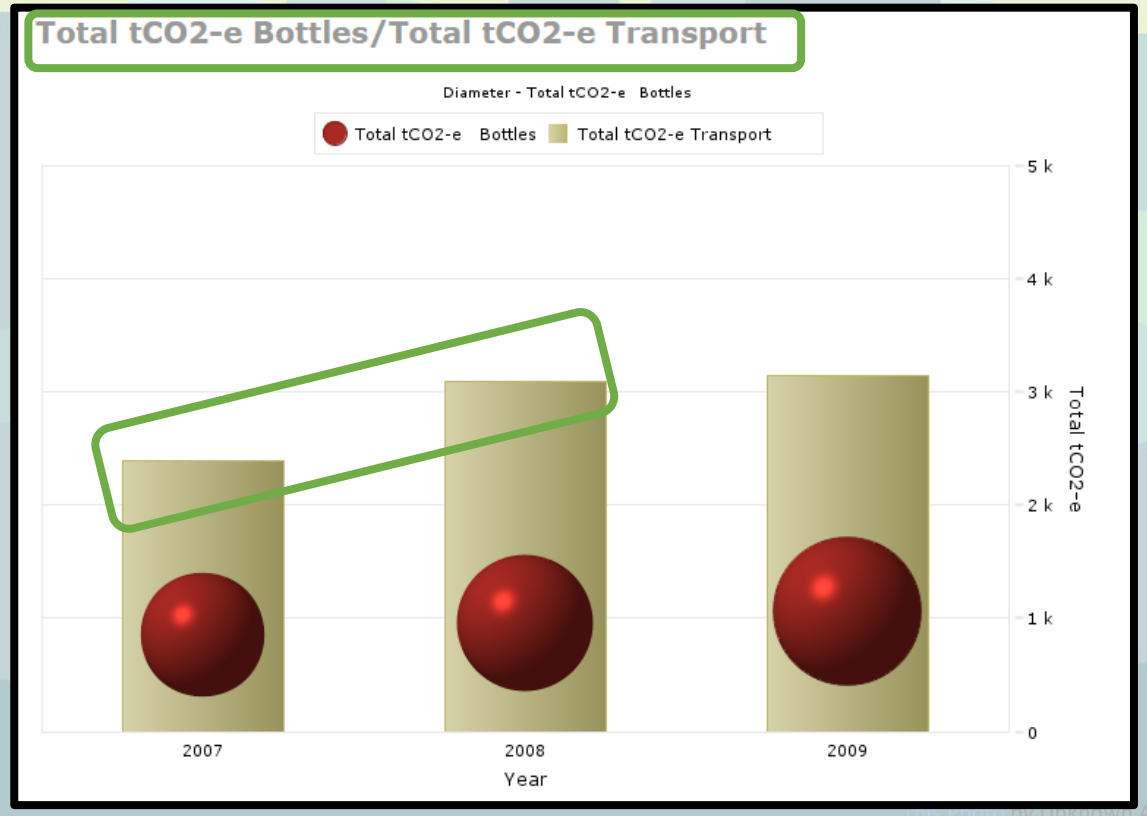
Company Sustainability Spider Graph

Year 2021



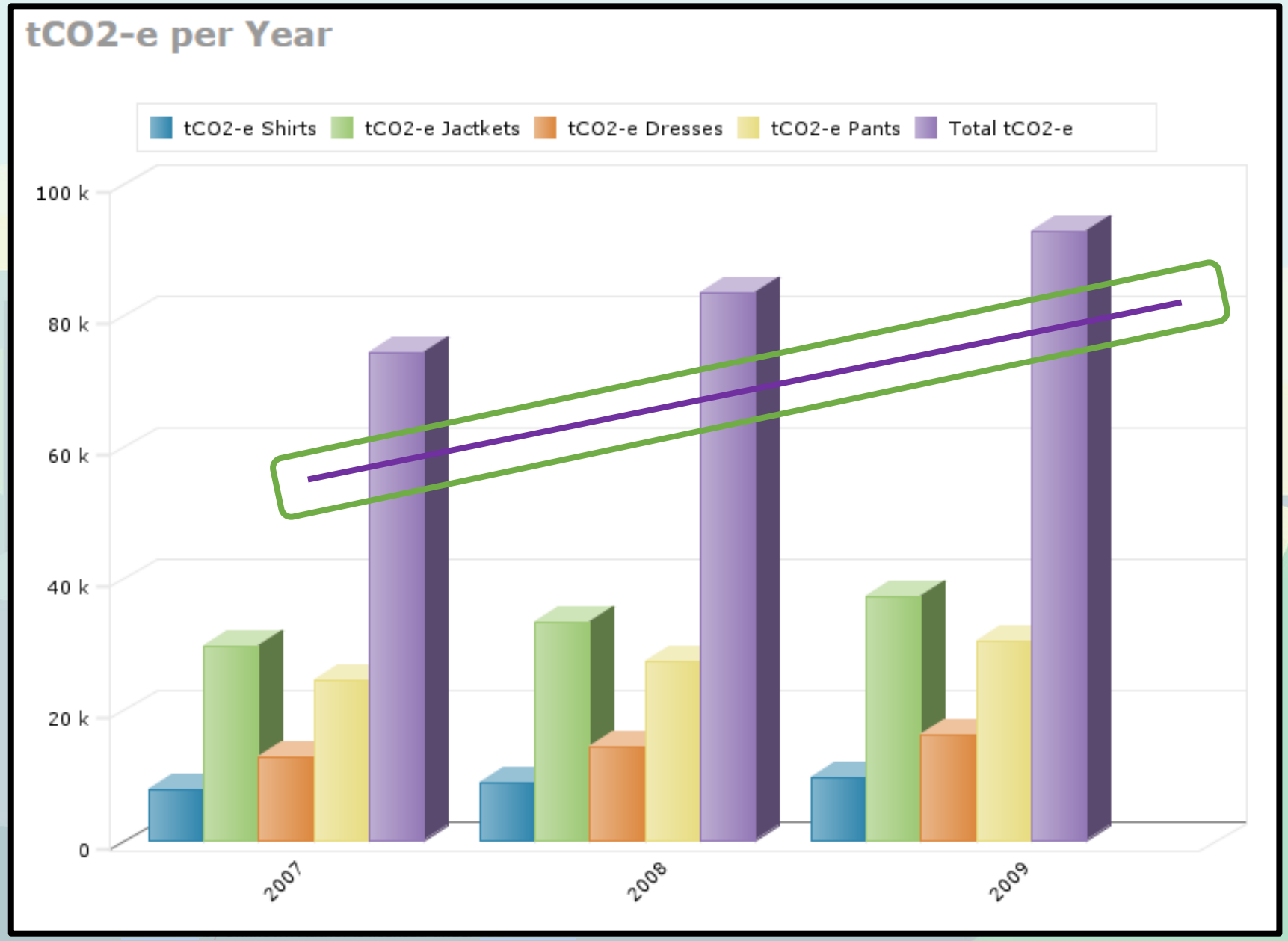
Foot (toe) Prints

Bottles – Some Bottle Analytics and Reports



- Total Bottles & tCO2-e per Customer
- Bottles Manufactured and tCO2-e per Year
- Revenue (US$) per tCO2-e by Year
- tCO2-e per Customer
- **Total tCO2-e Bottles/Total tCO2-e Transport**
- Total tCO2-e Analysis by Year
- Total CO2-e per Yr-Month
- tCO2-e per US$ 1Million per Customer
- tCO2-e per US$ 1Million per Year

Clothes – Some Clothes Analytics and Reports



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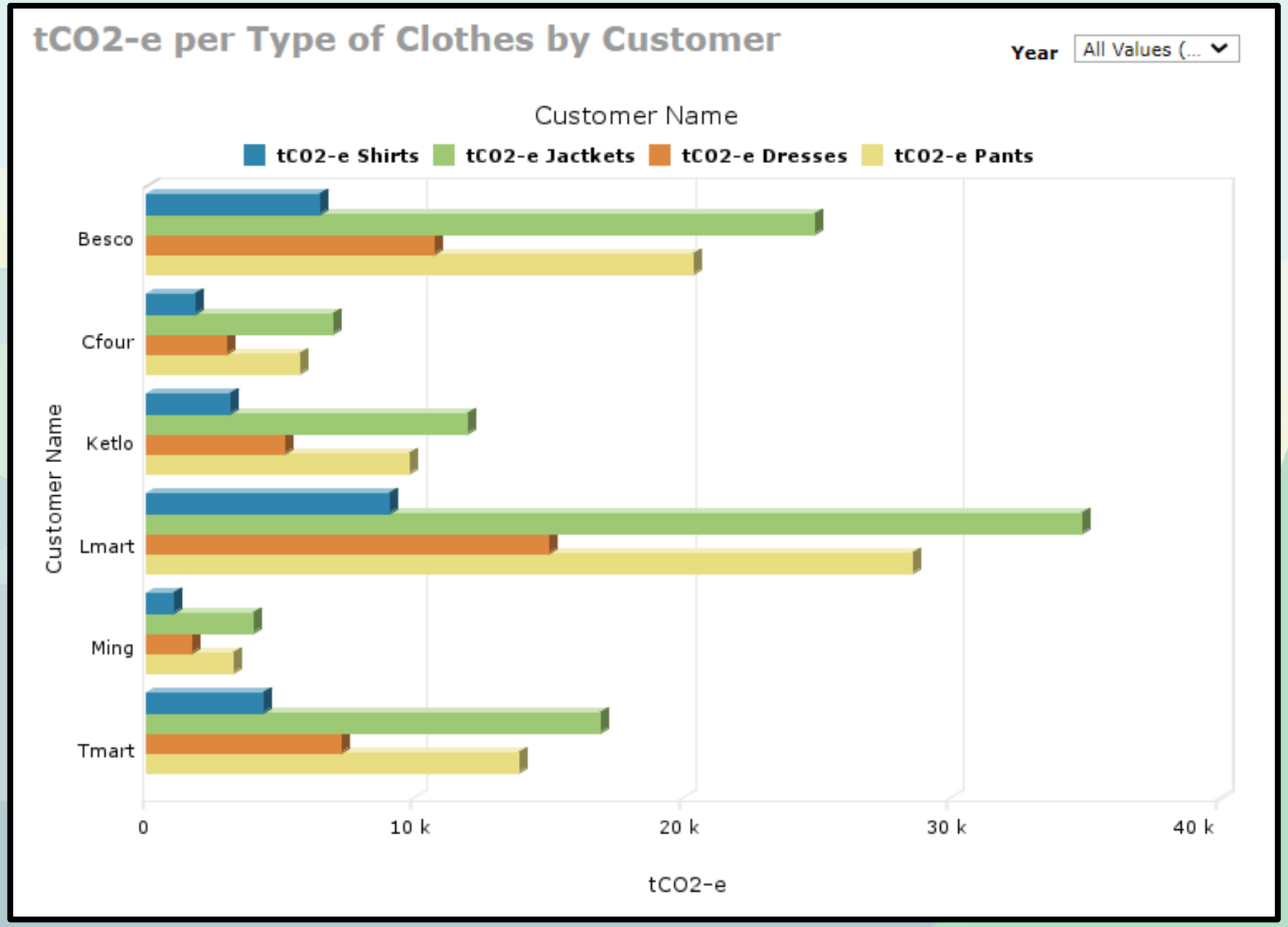
Clothes – Some Clothes Analytics and Reports



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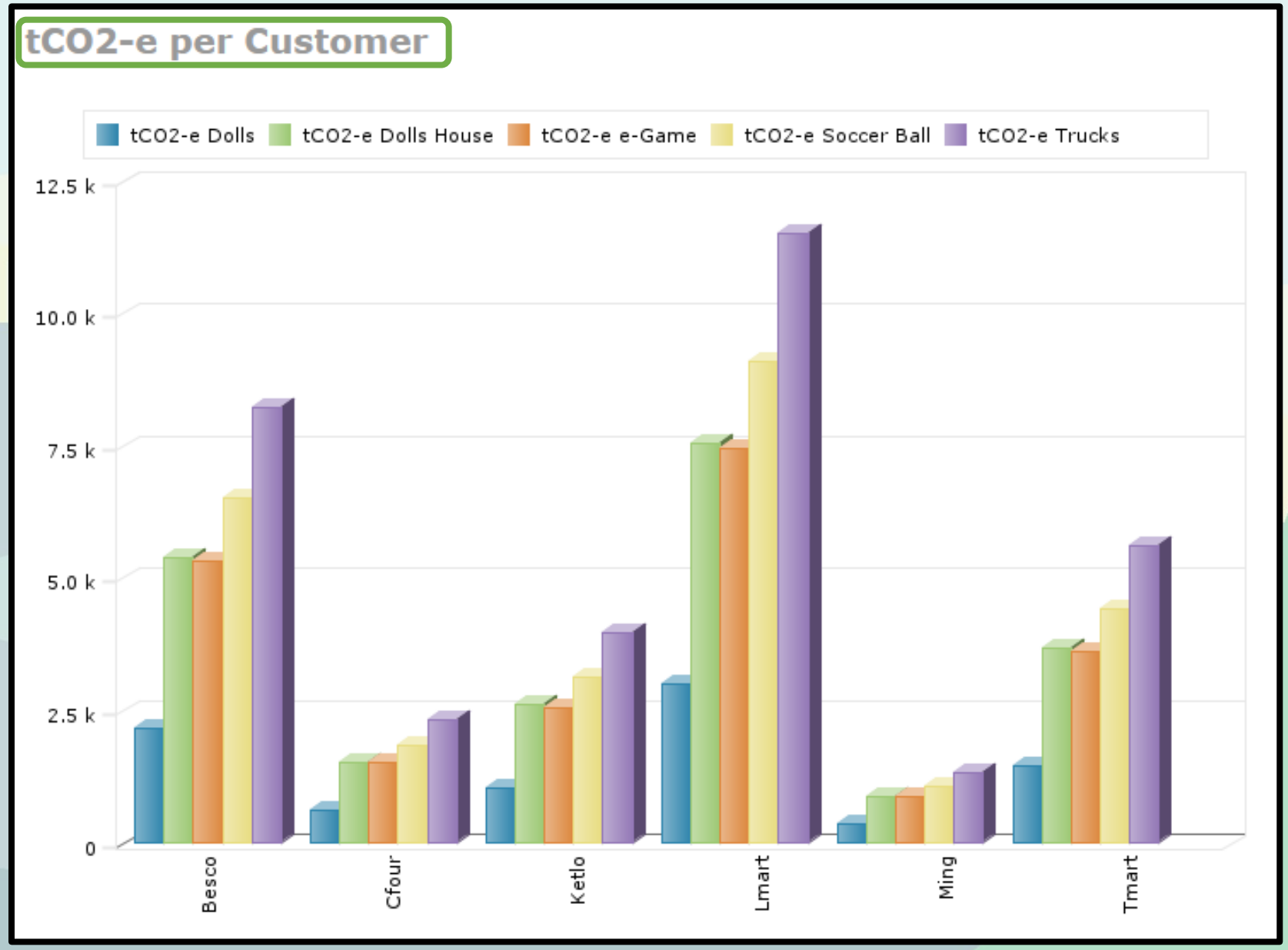
Toys – Some Toys Analytics and Reports

Toys tCO2-e per Year

tCO2-e per Toy by Customer

tCO2-e per by Customer by Year



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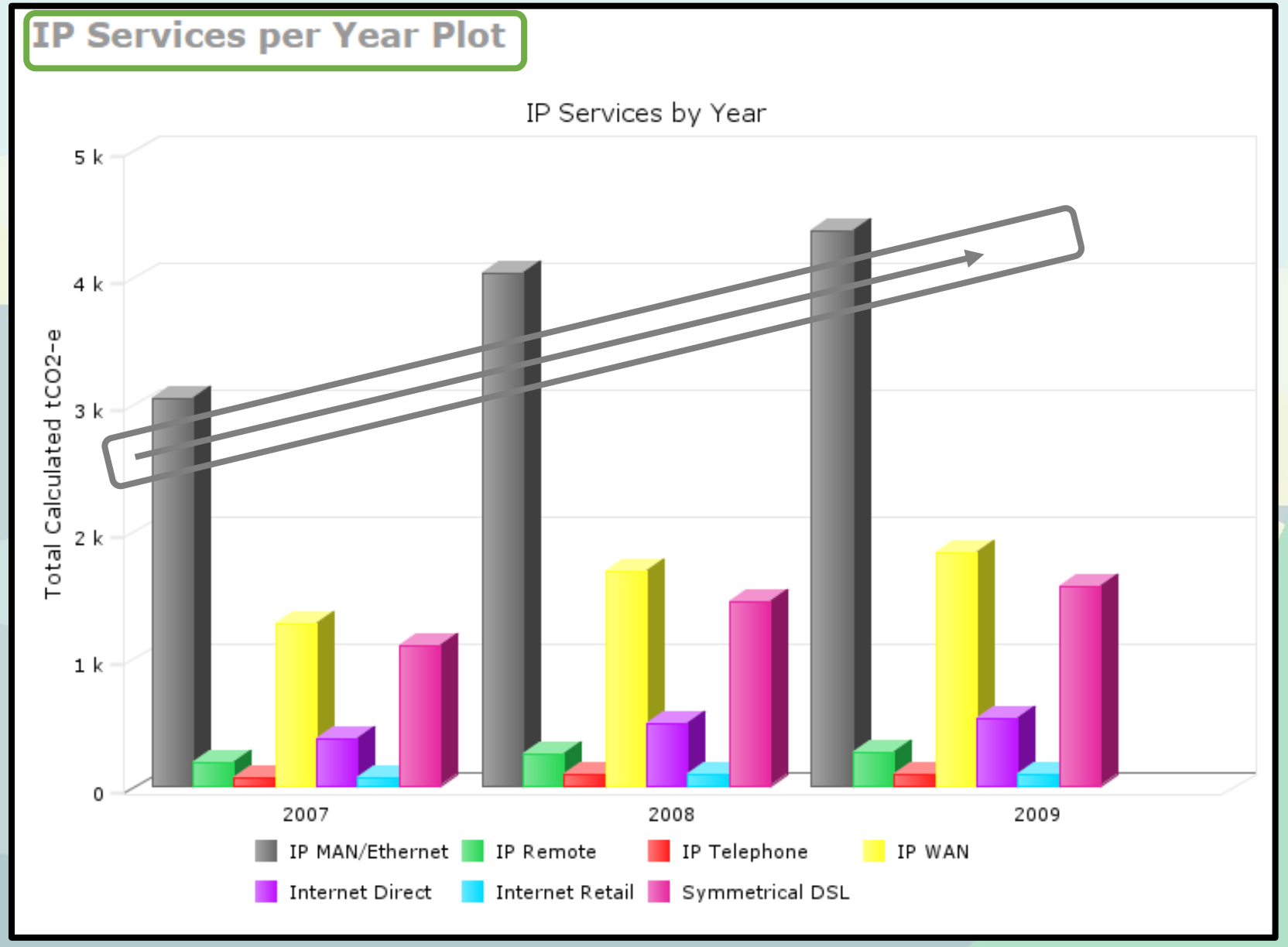
Telecom Services – Some TS Analytics and Reports

- IP Services Per Year Plot
- IP Services Stack Plot
- Total CF for Services
- Total CF Services Year Bubble
- Total CF Services Report
- Total Per Month Spline

IP Services per Year Plot



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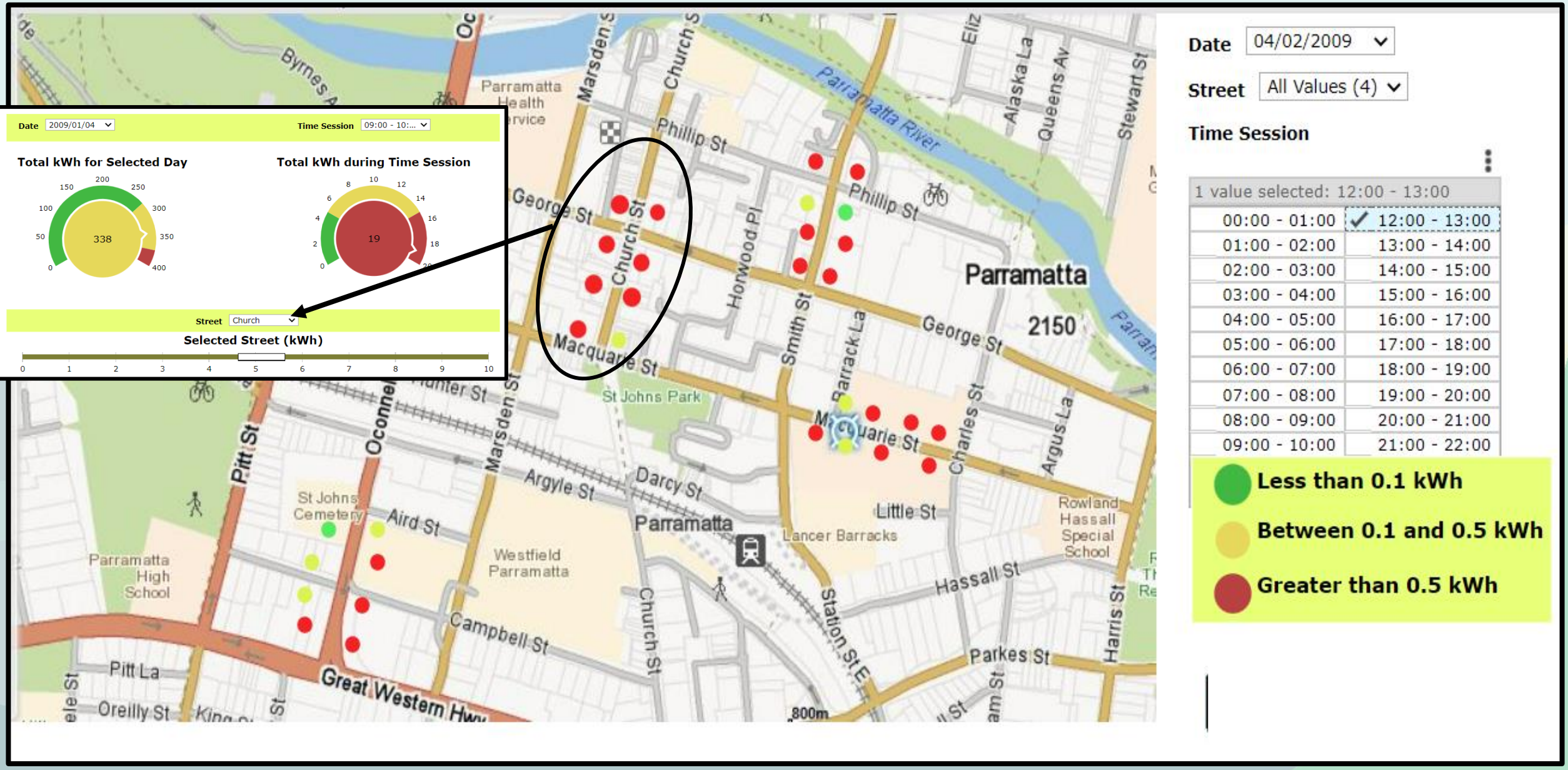
Smart City – Smart Electricity Usage



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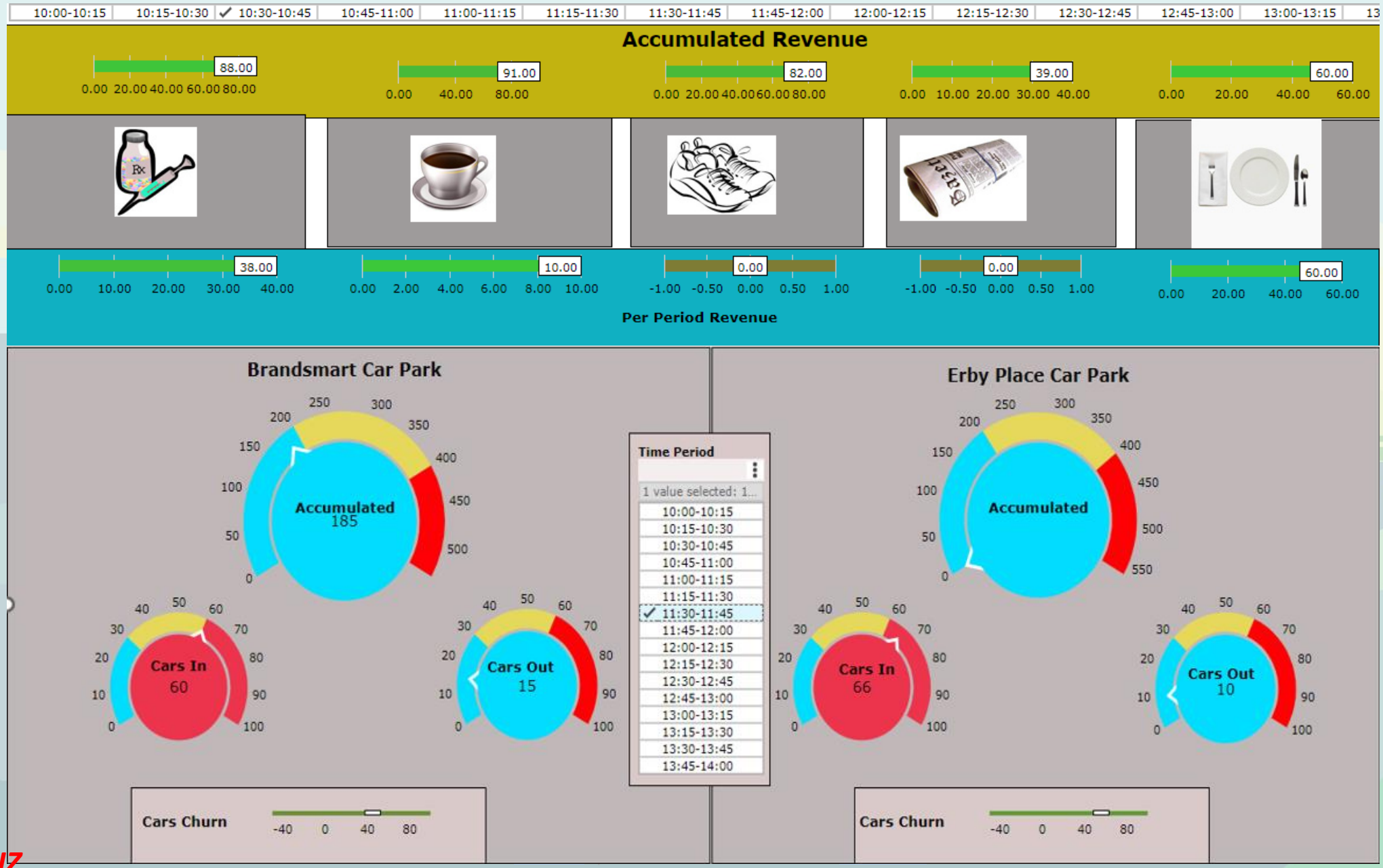
Smart City – Car Parks creating business for Shops



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Smart Energy Sourcing & Workplace - Scenarios

Scenarios: State Electricity Consumption - Workplace - Carbon Tax

NSW %	40	QLD %	10	SA %	15	TAS %	15	VIC %	10	WA %	10
Office %	70	Home office %	30	Telecentre%	10	Carbon tax $	10		Go		

Carbon Tax

Year	Savings on States changes	Savings on Workplace changes	TOTAL Savings
Totals	**35,405**	**35,088**	**70,493**
2007	3,841	3,806	7,647
2008	13,086	12,969	26,055
2009	18,479	18,313	36,791

Total Savings $

Year	Savings in Elect Cost $	Savings in Carbon Tax $	Total Savings (Elect cost + Carbon Tax)
Totals	**491,180**	**70,493**	**561,673**
2007	53,284	7,647	60,931
2008	181,543	26,055	207,598
2009	256,353	36,791	293,144

Back to Scenarios | Back

Original Situation:

STATE	Original %	Scenario %	% Diff
Totals	**100**	**100**	**0**
NSW	35	40	5
QLD	15	10	-5
SA	10	15	5
TAS	5	15	10
VIC	25	10	-15
WA	10	10	0
WORKPLACE			
Office	100	70	-30
Home Office	0	30	30
Teleworking	0	10	10

Carbon tax	Original$	Scenario$	$ Diff
	0	10	10

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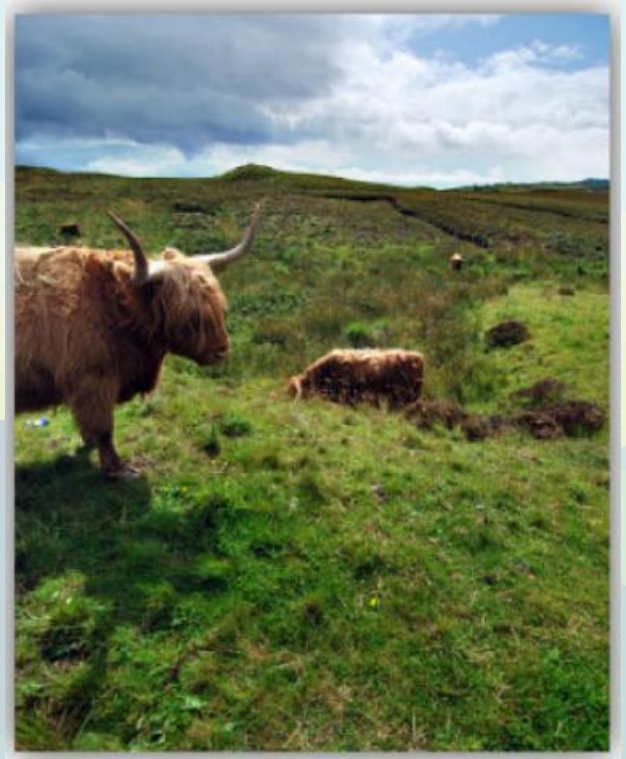
Smart Workplace - Scenarios



- Workplace and Carbon Tax
- Electricity State and Carbon Tax
- State and Work Scenario
- Savings in CO2 Emission
- Total Savings in Elect cost and Carbon Tax

Scenarios: Workplace and Carbon Tax

Year 2020

Office % 70 | Home office % 30 | Telecentre% 10 | Carbon tax $ 10 | Go

Savings Details

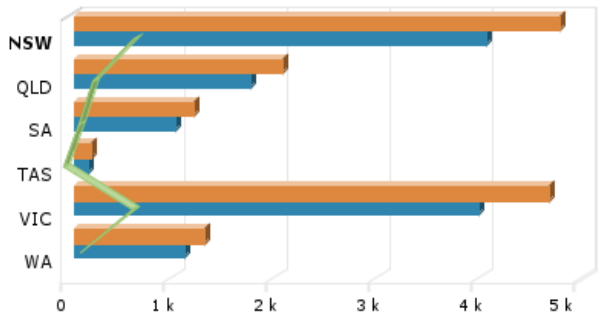
State	CO2-e Tonnes	Electricity $	Carbon Tax $	Total Savings $
Totals	**2,109**	**259,738**	**21,091**	**280,829**
NSW	738	90,908	7,382	98,290
QLD	316	38,961	3,164	42,124
SA	211	25,974	2,109	28,083
TAS	105	12,987	1,055	14,041
VIC	527	64,935	5,273	70,207
WA	211	25,974	2,109	28,083

Original Situation:

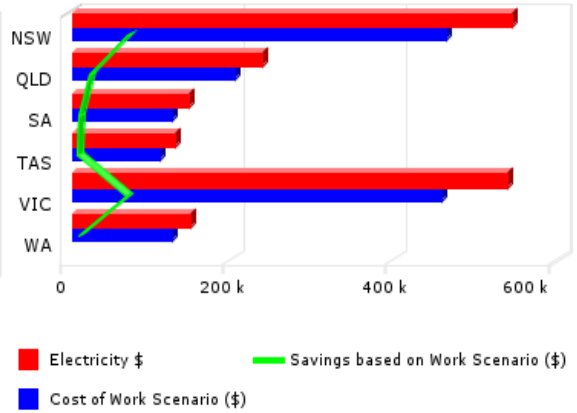
WORKPLACE	Original %	Scenario %	% Diff
Office	100	70	-30
Home Office	0	30	30
Teleworking	0	10	10

Carbon tax	Original$	Scenario$	$ Diff
	0	10	10

Changes in Carbon Emission (tonnes)



Changes in Electricity Cost $



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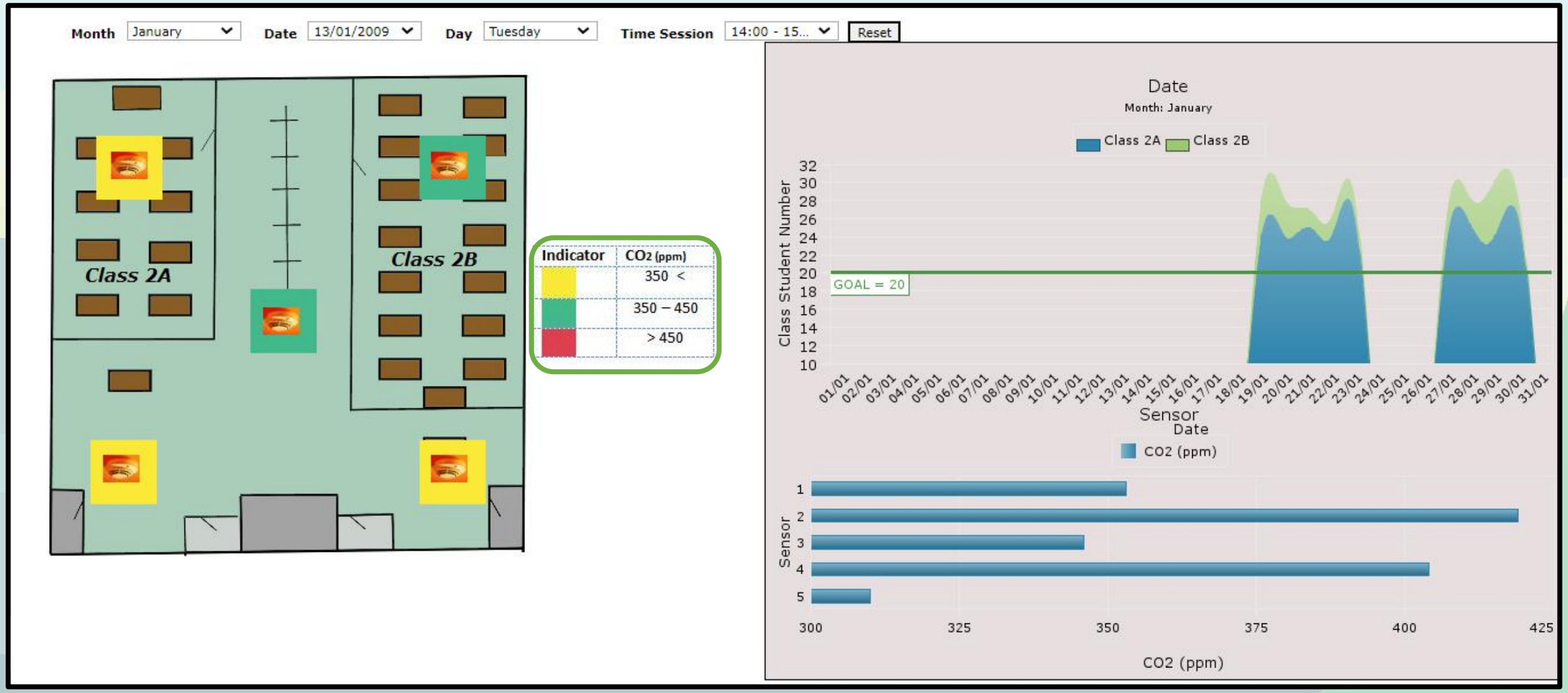
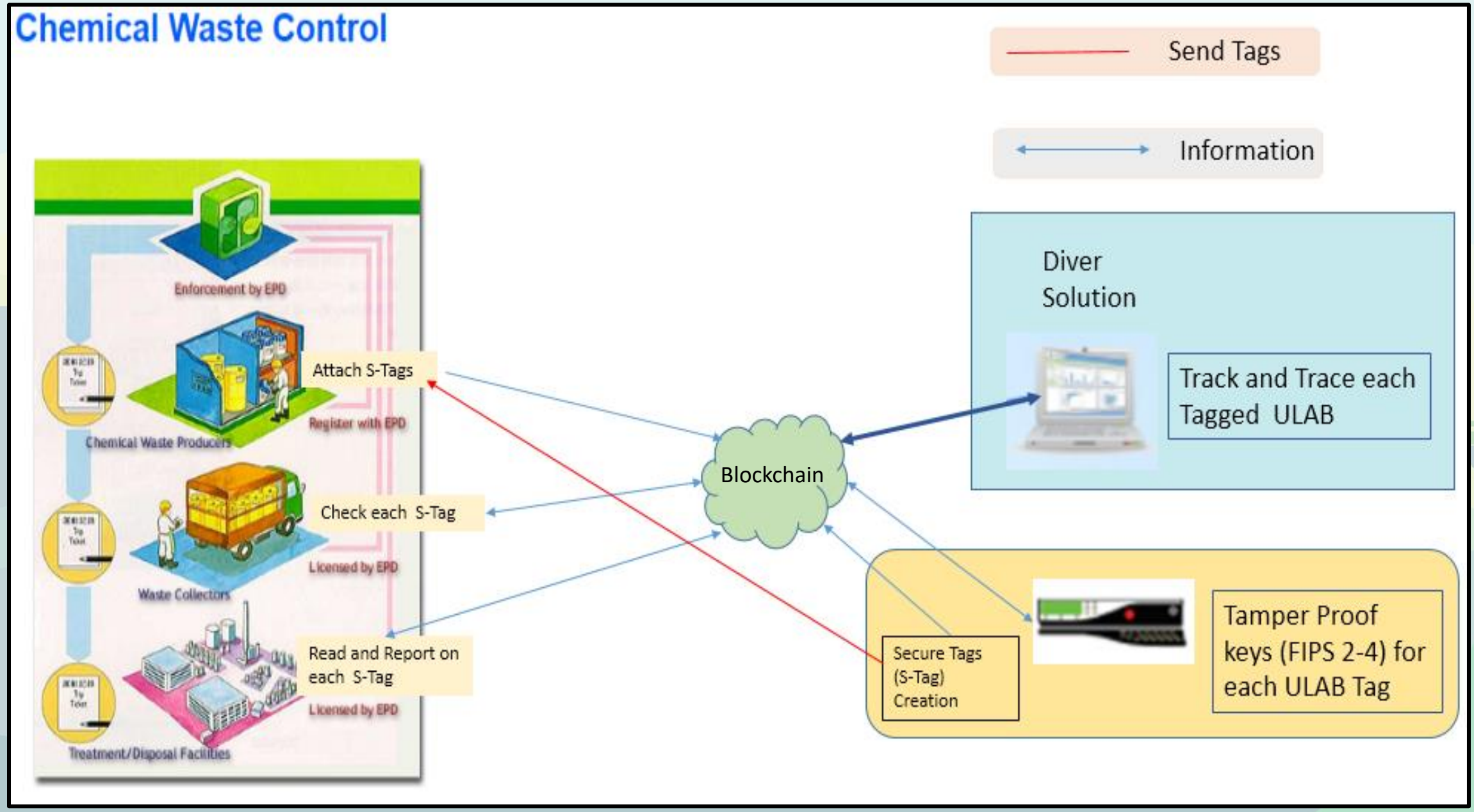
Smart Healthy Classrooms

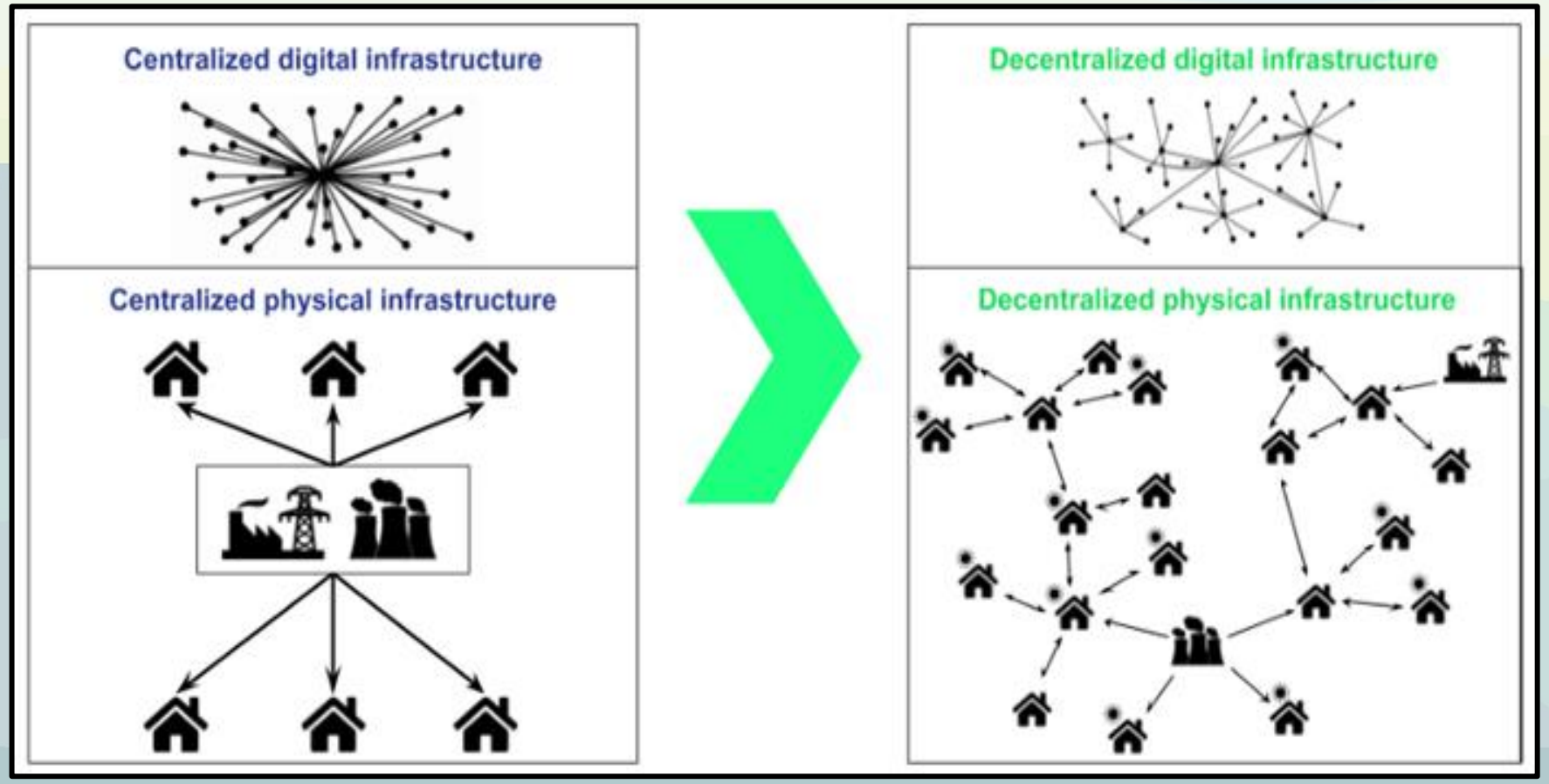


Carbon Analytics for decarbonising Waste Management - Example



Blockchain and Decarbonisation - Example

Decarbonisation leveraging Technologies such as IoT devices; electric vehicles; Big Data and AI to reduce carbon by decentralised blockchains providing:



1) Interoperability throughout various grid layers

2) Robustness network security

3) Data transparency & immutability and

4) Fraud resistance

How can blockchain help to achieve decarbonization, decentralization & digitalization of the energy market? | by DEEP | Konfidio Blockchain Venture Studio | Medium

Digital Twin – Building Industry - Example

A **digital twin** is a **virtual** model designed to accurately **reflect** a physical object.

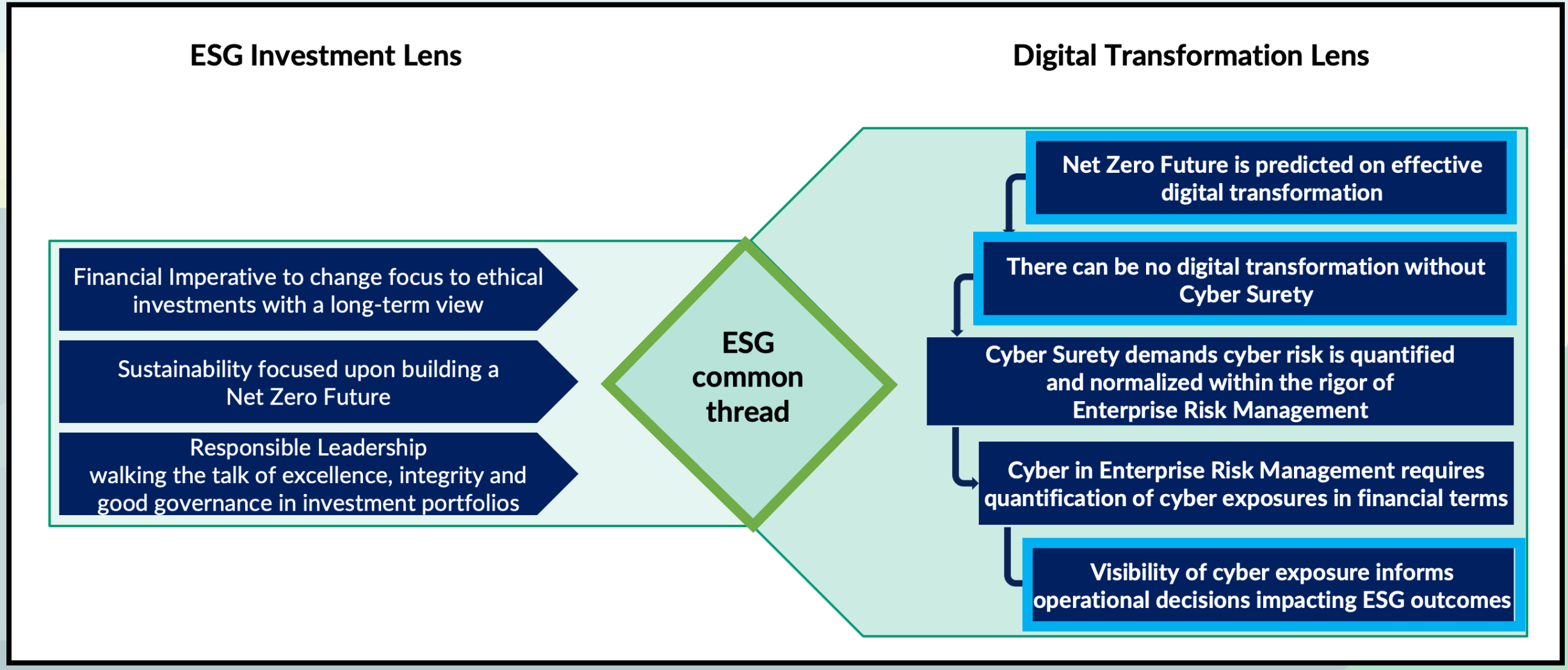
Building case studies show in new building projects more than:

- ✓ **50% of emissions** from **embodied carbon** and
- ✓ **70%** of this comes from **six materials.**
- ✓ **20%** of life-cycle emissions come from the **maintenance and refurbishment**.

85 Percent of Hong Kong Buildings Require Extensive Retrofitting to Reach Decarbonization Goals

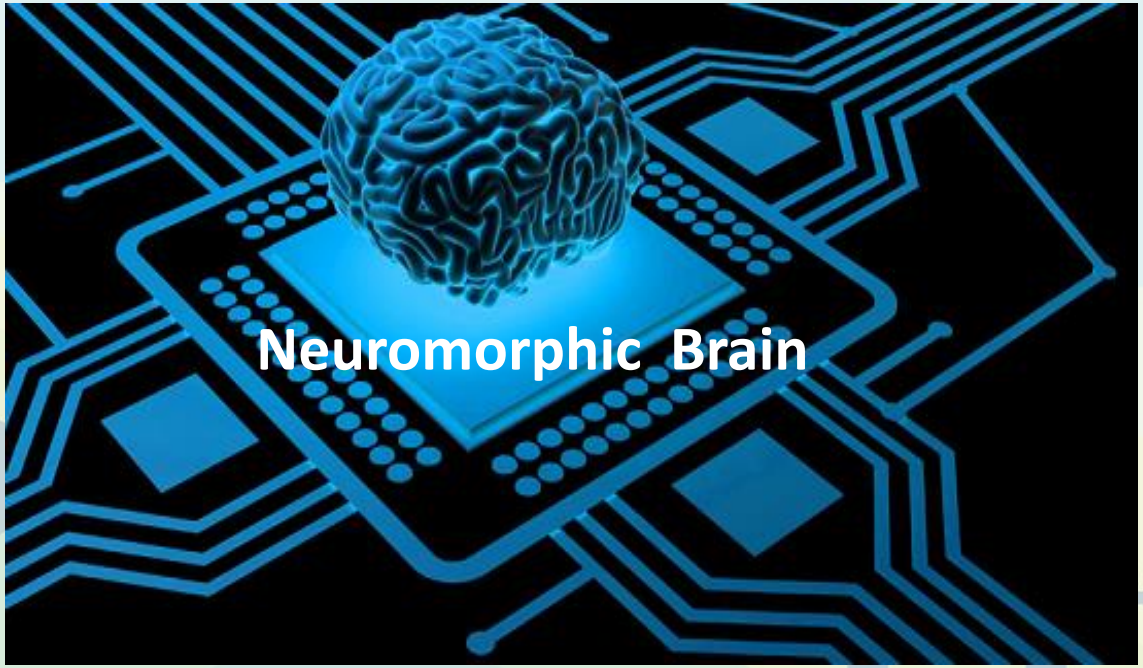
Smart Cybersecurity and Digital Decarbonisation

Effective execution of Digital Decarbonisation is predicated on tackling Cybersecurity



[Global Net Carbon Zero ambitions and the role of Cyber in ESG (denexus.io)]

Neuromorphic Computers



- ✓ Save Processing Energy
- ✓ Increase AI powered carbon zero initiatives
- ✓ Lower Carbon Footprint

Opportunities for neuromorphic computing algorithms and applications | Nature Computational Science

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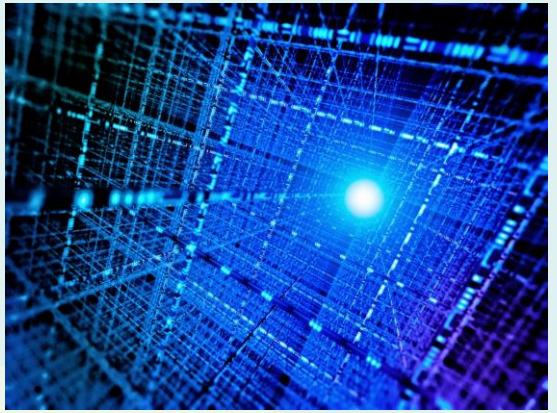
Quantum Computers

Quantum Computers compared to Super computers is in the realm of comparing an abacus to a Super Computer



Quantum Computer

Super Computer

Abacus

- ✓**Better Carbon management modelling**
- ✓**Better CO2 Scrubbing Materials**
- ✓**Increased power of AI driven climate initiatives**

IBM promises a 4,000 qubit quantum computer by 2025. For some simple use cases, organizations should be able to deploy quantum computers in the 2023 to 2025 time frame

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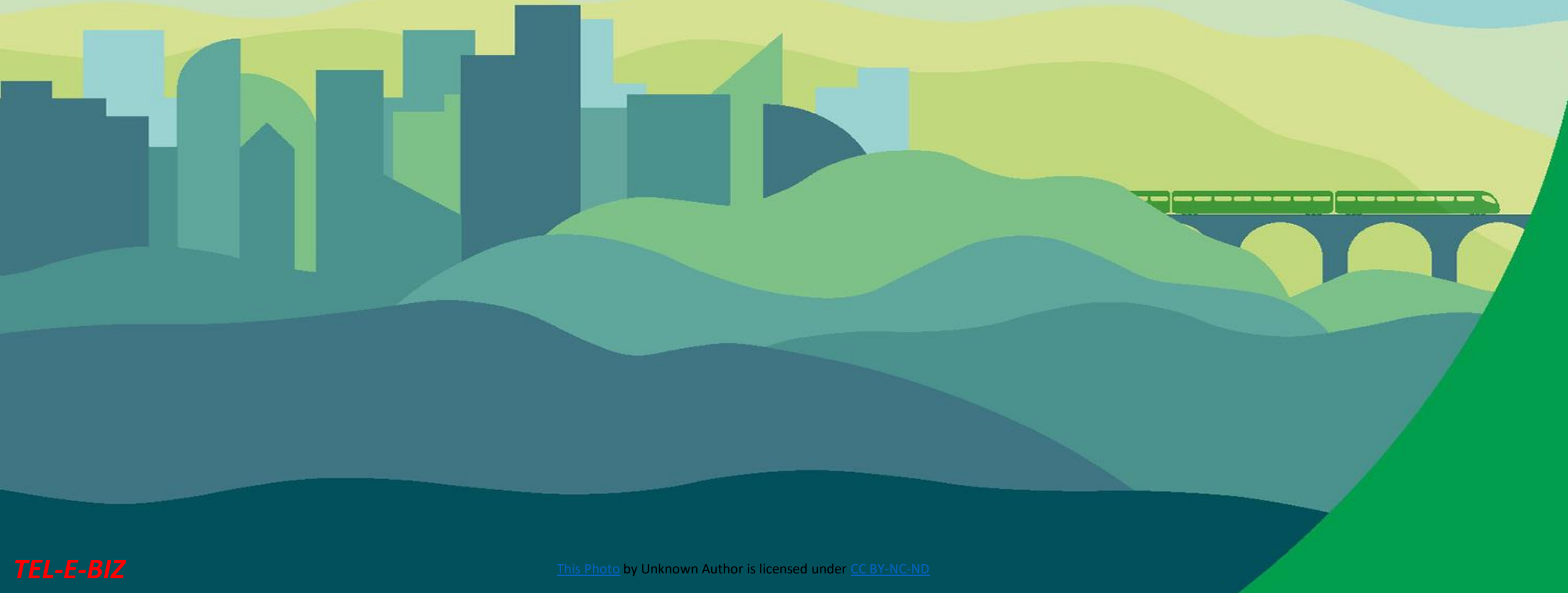
Potential IT and Decarbonisation Opportunities for Hong Kong

- ✓ **Become a leader in Smart building and decarbonised refurbishment**
- ✓ Become a leader in high-tech Digital Decarbonisation Applications (IIoT and Blockchain)
- ✓ **Become a Digital Twin Centre of Excellence and Experience in Asia**
- ✓ Build Net-Zero CO2 Emissions driven solutions based on Quantum Computers and Neuromorphic computers
- ✓ **Work with the GBA as a digital decarbonisation development Zone and showcase for Asia.**
- ✓ Become a regional leader in Carbon Credit trading
- ✓ **Become a digital decarbonisation cybersecurity leader in Asia**

Decarbonisation and **Net Zero CO2 Emissions** Goals cannot be reached without IT and Organisations have a key role in achieving these by applying **Digital Decarbonisation.**

Many more "Blue" Sky Days in a more prosperous Hong Kong



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