



E-liability
Institute

Introduction to Sustainable Management

2024



What is Sustainable Management?

- Sustainable Management considers both **financial** and **environmental** sustainability, simultaneously.

What does this mean in practice?

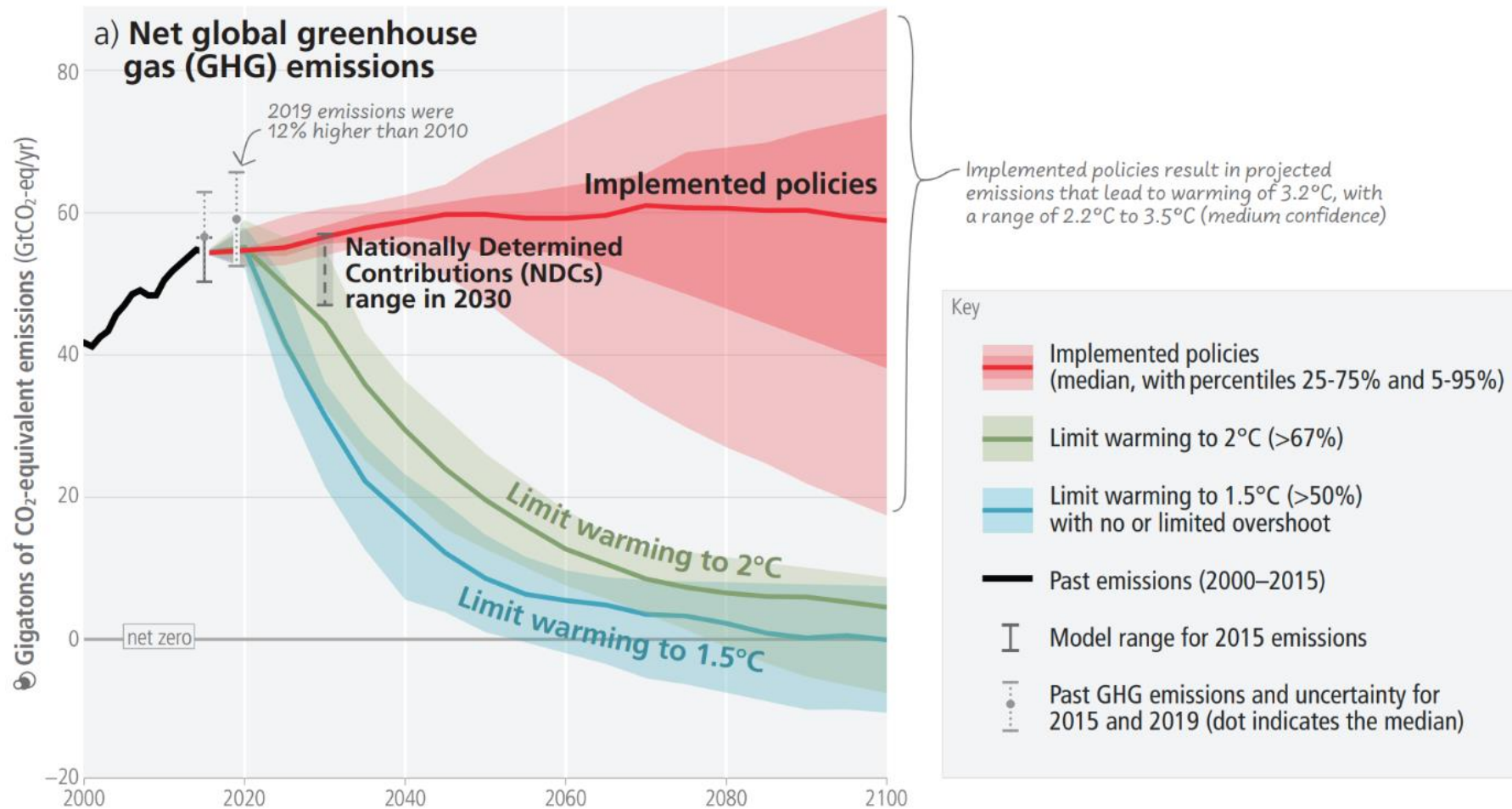
- A model of the entire operations of the organization using **Activity-Based Costing** and **Carbon Accounting** and we are using the **E-Liability Methodology** for this.
- The model will flow both financial and environmental metrics through the entire operations of the organization down to individual products and services.
- Environmental metrics can cover a wide-range of areas, our starting point will be Greenhouse Gas Emissions.
- This provides **actionable data to reduce emissions** in a **financially sustainable/profitable** way.
- Focused more on internal management but can support external reporting.

Why are we doing this?

Time is running out!

Limiting warming to 1.5°C and 2°C involves rapid, deep and in most cases immediate greenhouse gas emission reductions

Net zero CO₂ and net zero GHG emissions can be achieved through strong reductions across all sectors



“It turns out that reporting is not a proxy for progress.” - Duncan Austin, a former ESG investment manager

The world just marked a year above a critical climate limit scientists have warned about

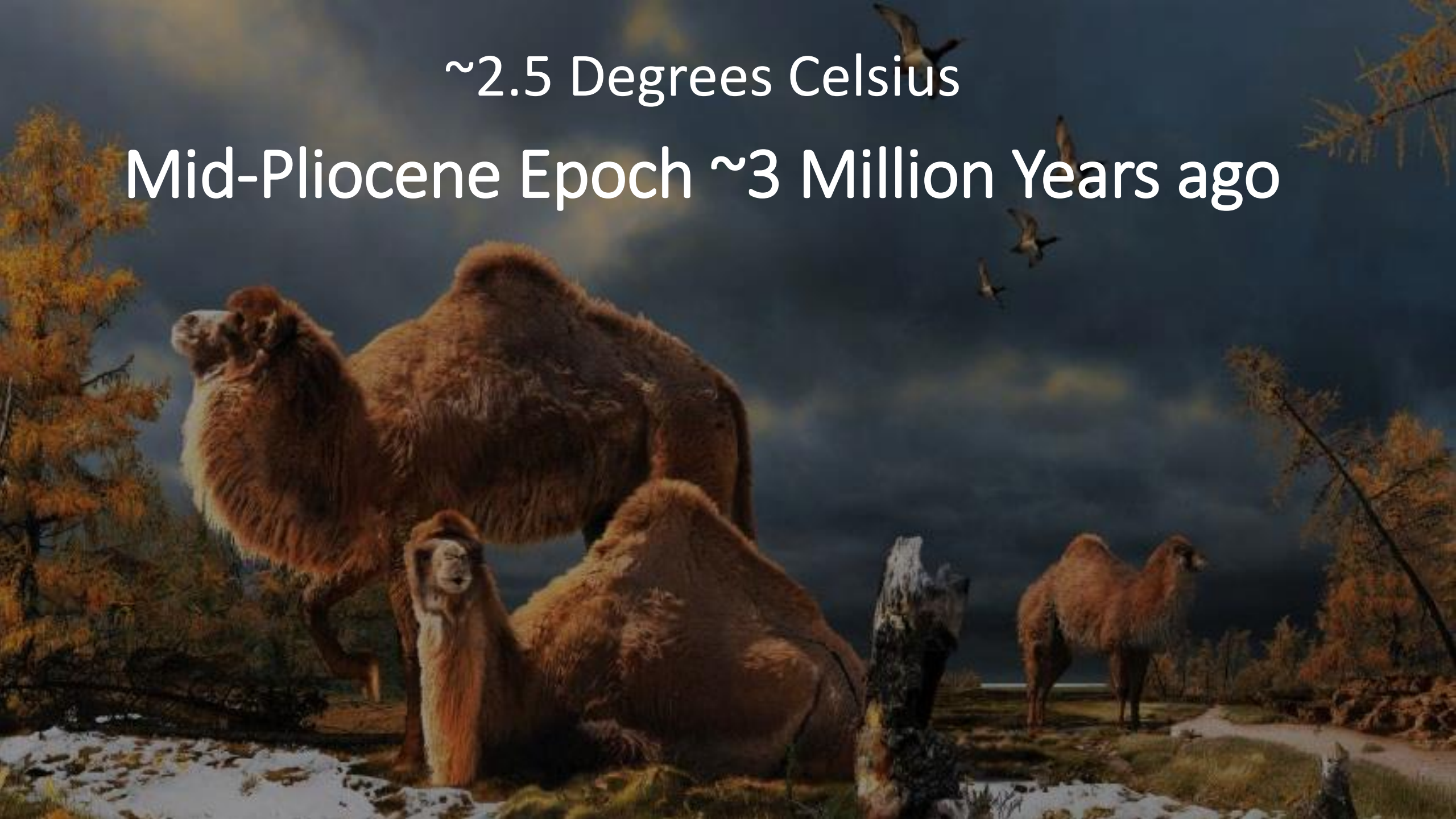
By Angela Dewan, CNN
© 2 minute read · Updated 8:37 AM EST, Thu February 8, 2024



Firefighters in the hills of Valparaiso, Chile on February 3, 2024, as the country suffers its most lethal fires on record. Javier Torres/AFP/Getty Images

(CNN) — Global warming surpassed 1.5 degrees Celsius over the past 12 months for the first time on record, new data shows, breaching a critical threshold that, if it continues, will push the limits of life on Earth to adapt.

~2.5 Degrees Celsius
Mid-Pliocene Epoch ~3 Million Years ago



“It’s as if a person committed to a diet and fanatically started counting calories, but continued to eat the same number of Twinkies and cheeseburgers.” – Auden Schendler, senior VP sustainability for Aspen Skiing Company

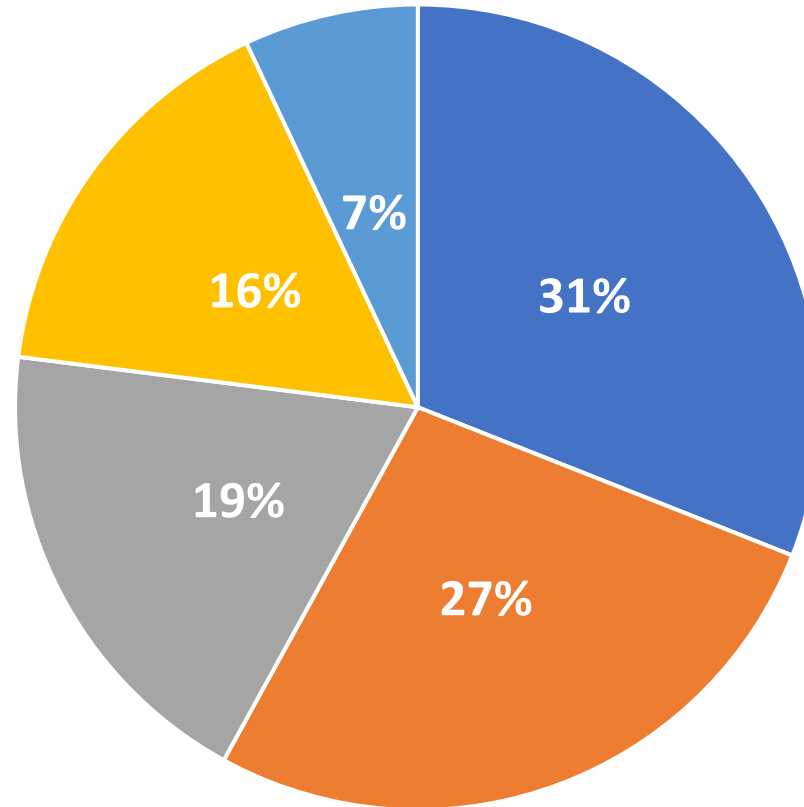
There is currently no rigorous accounting standard for GHG emissions accounting!

“It would be like the Security and Exchange Commission or the IASB saying ‘oh if **you don’t know your gross margins**, you don’t know your cost of goods sold, **no problem just find some industry average** and use that, that’s totally fine.’ We couldn’t run a business, we couldn’t run an economy like that, the stock market would crash because there was no information. In fact, that was like the world we lived in the 1920s that lead to the stock market crash of 1929. **So, if we are really serious about addressing climate change, then at the heart of it is good carbon accounting!**” - Karthik Ramanna – Professor of Business and Public Policy, Blavatnik School of Government, University of Oxford.

“Climate risk is financial risk, and companies and their boards should manage it as such. Climate risk can be quantified, measured, and mitigated. It can represent a strategic opportunity for competitive differentiation as long as the company's claims for differentiation can be audited and are meaningful to its customers.

It matters how a company does its carbon accounting. **Management and the board need rigorous emissions accounting to understand and mitigate risks and seize opportunities.”** – Michael Mahoney – CEO E-Liability Institute

How much greenhouse gas is emitted by the things we do?



■ Making Things ■ Plugging In ■ Growing Things ■ Getting Around ■ Keeping warm and cool

Source: How to Avoid a Climate Disaster – Bill Gates

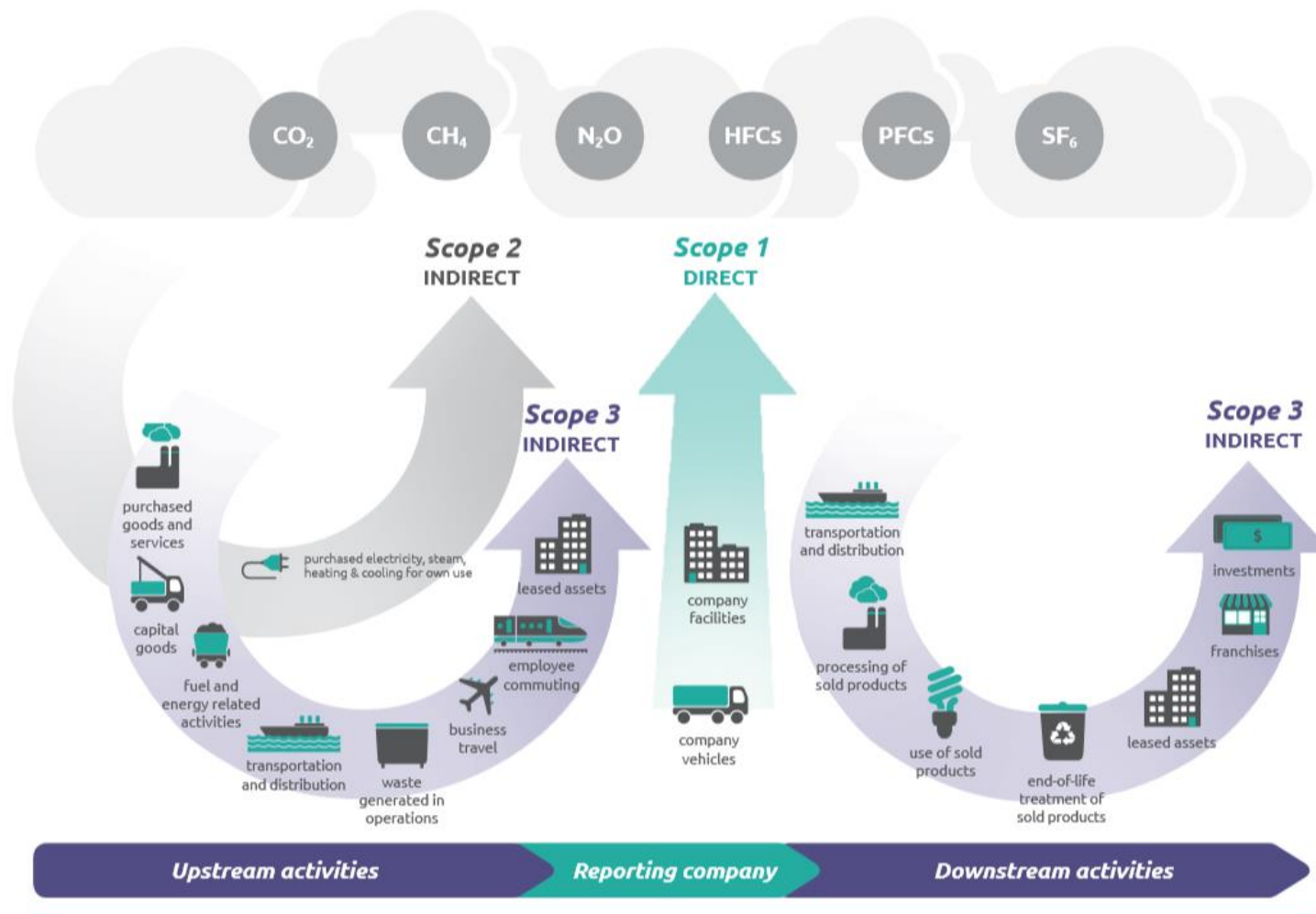
Every Organization must do their part

- Organizations have been reporting for over two decades, but it's not having much impact.
- We need to focus on Reduction rather than just Reporting.
- We need to focus on the things we can control.

- A standard that was introduced in 2001.
- Provides a method of measuring an entities direct, upstream and downstream GHG emissions.
- Defines three types of Scope
 - Scope 1 – Emissions that go directly into the atmosphere – Pollution from smokestacks and car exhausts, as well as all the cows burps and farts.
 - Scope 2 – Primarily electricity consumption, can include Gas
 - Scope 3 – Everything else! Scope 3 is a big problem!

Scope 3 is complicated

Figure [1.1] Overview of GHG Protocol scopes and emissions across the value chain



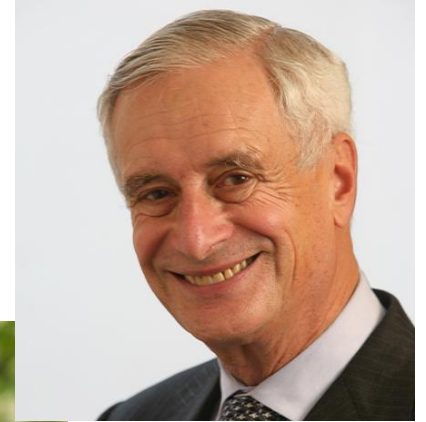
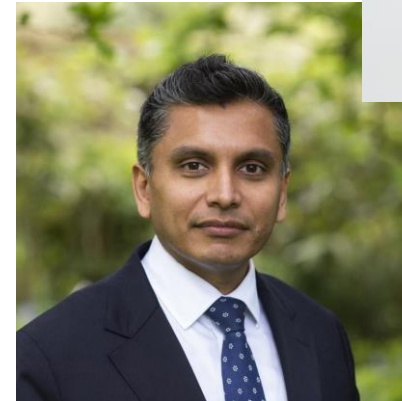
- Mostly industry averages
- Counted multiple times through value chain
- Unfairly burdens organizations with an inflated total emissions footprint
- A reduction in Scope 3 emissions might not translate to an actual reduction of emissions from the atmosphere because the number does not properly represent the actual embedded emissions.

E-liability Institute

E-liability accounting principles were developed in 2021 by [Professor Robert Kaplan \(Harvard\)](#) and [Professor Karthik Ramanna \(Oxford\)](#) (won McKinsey Prize for most impactful 2021 Harvard Business Review article, reference at end of slide pack).

*In 2022, Kaplan and Ramanna established the non-profit **E-liability Institute** to drive the idea into practice, with several major organizations donating time and money to get us off the ground.*

<https://e-liability.institute/>



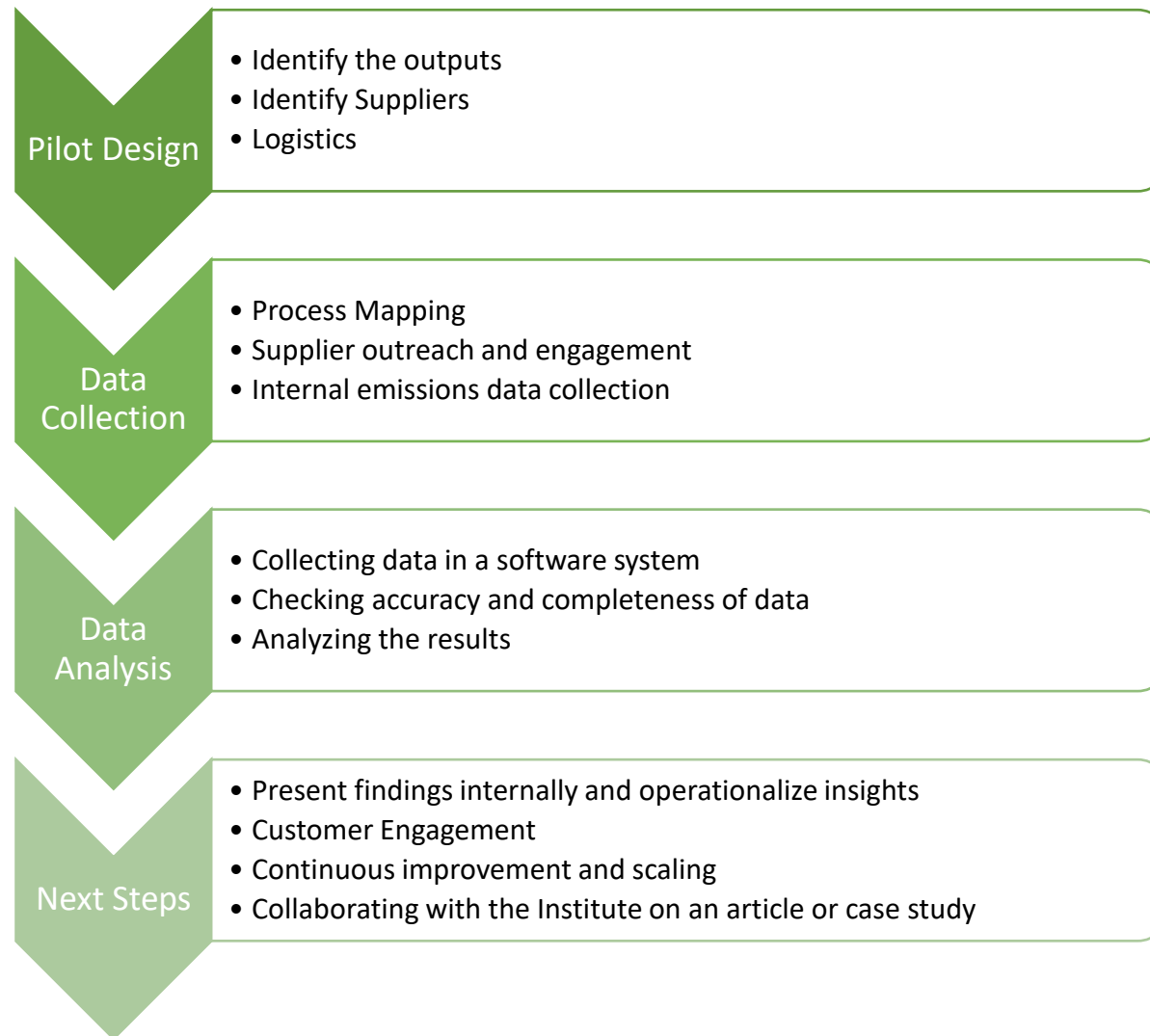
- Scope 1 emissions are counted and audited once and only once.
- The organization only needs to know its Scope 1 (if any) plus the embedded emissions of its DIRECT suppliers.
- These emissions are then allocated to its products/services to pass to its customers as its total embedded emissions.
- There is no requirement to estimate the entire value chain for Scope 3 – saving significant time and stress.
- Scope 1,2 and 3 will now be either direct emissions or embedded emissions.

What is the cost impact?

- Do you know the cost impact of reducing emissions at your organizations?
- According to IFAC only 24% of companies that report emissions know how much it will cost to reduce emissions.
- We want to embed cost right from the beginning.
- Activity-Based Costing is the perfect method of calculating both emissions and cost through to final product/service.

- Redesign Products/Services
- Reengineer Processes
- Procure lower emissions supplies
- Use fewer high emissions resources

- Keep it simple
- Do we emit any GHG emissions directly? What is it and can we measure it?
- What power do we consume? Electricity, Gas – where does it come from, can they provide us with embedded emissions?
- What suppliers do we use? Can they provide us with their embedded emissions? Probably not, so we'll need to use estimates/averages.



[E-liability Institute Pilot Resources](#)

King County - Pilot Model

- King County Stats

Population: ~2.3 million

Budget: \$16.2 Billion

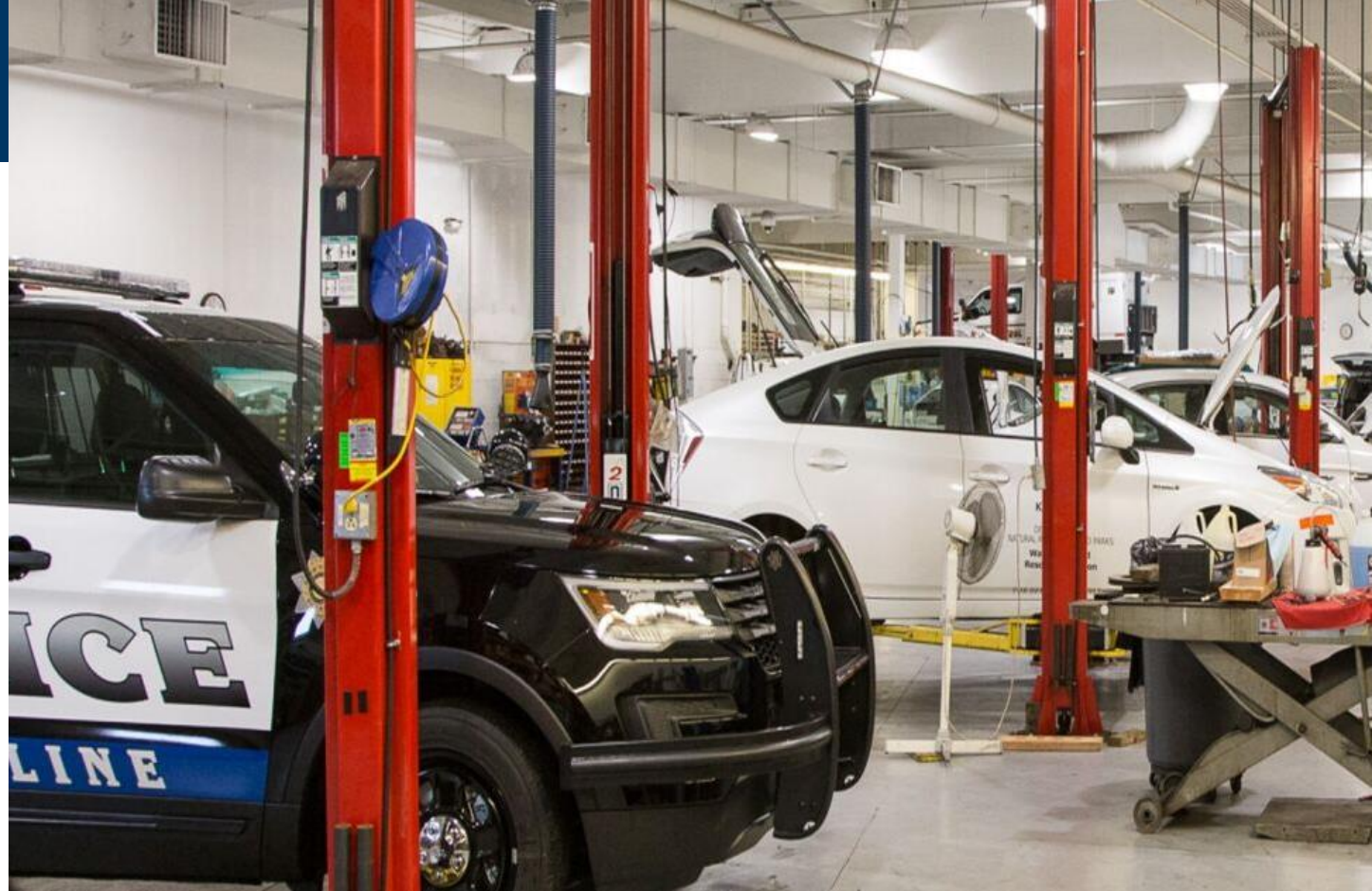


Fleet Services Division

The King County Fleet Services Division manages the full lifecycle for over 2,800 vehicles and equipment for County agencies and services including:

- Sheriff's Office
- Parks
- Roads Maintenance,
- Wastewater Treatment
- Water and Land Resources
- Facilities
- Department of Adult and Juvenile Detention
- Public Health

Additionally, Fleet operates Storerooms with parts, materials, supplies, construction equipment and signs for King County agencies and contract cities to enable efficient service delivery.



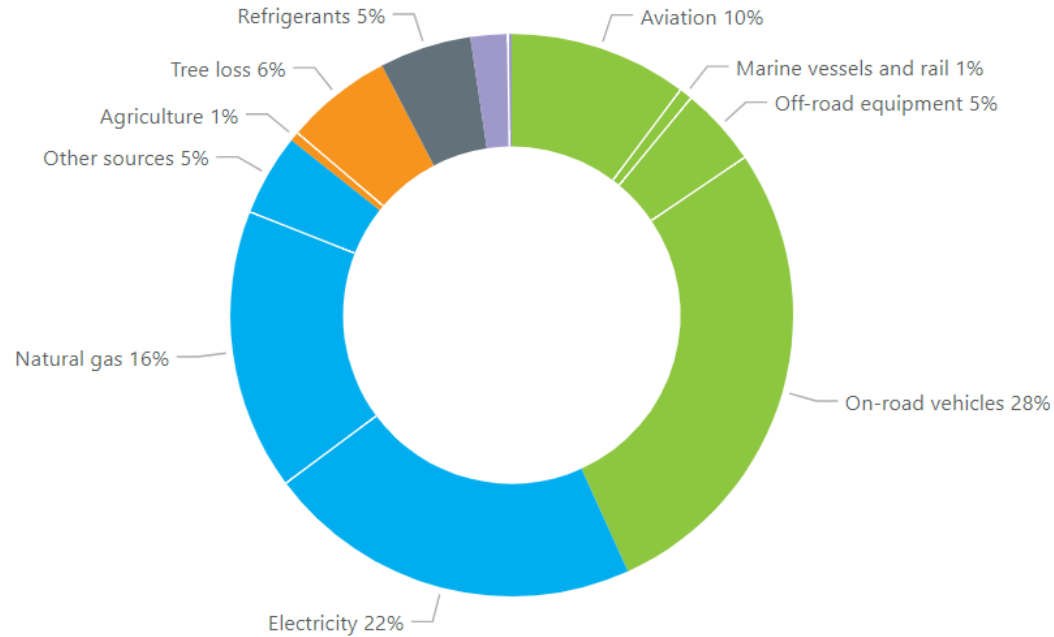
King County Emissions Summary

Total Emissions, by Sector

Jurisdiction
 King County

This PowerBI inventory dashboard tool uses methodologies as described in the King County Geographic GHG Inventory Report available at: www.kingcounty.gov/climate

Many cities in King County also independently conduct their own greenhouse gas (GHG) emissions inventories which can use different methodologies.



Sector ● Transportation & Other Mobile Sources ● Built Environment ● Land Use ● Refrigerants ● Solid Waste & Wastewater

**Total GHG Emissions for King County in 2020:
 22,921,227 MTCO₂e**

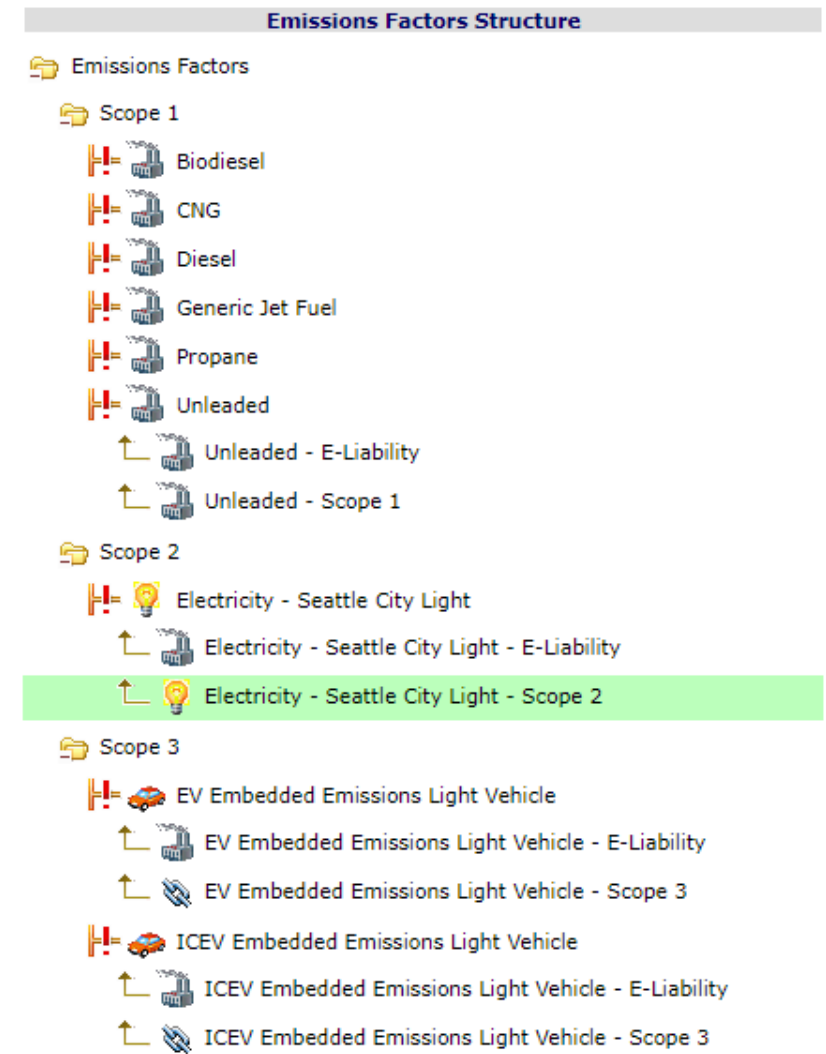
Year: 2020

2008	2015	2017	2019	2020
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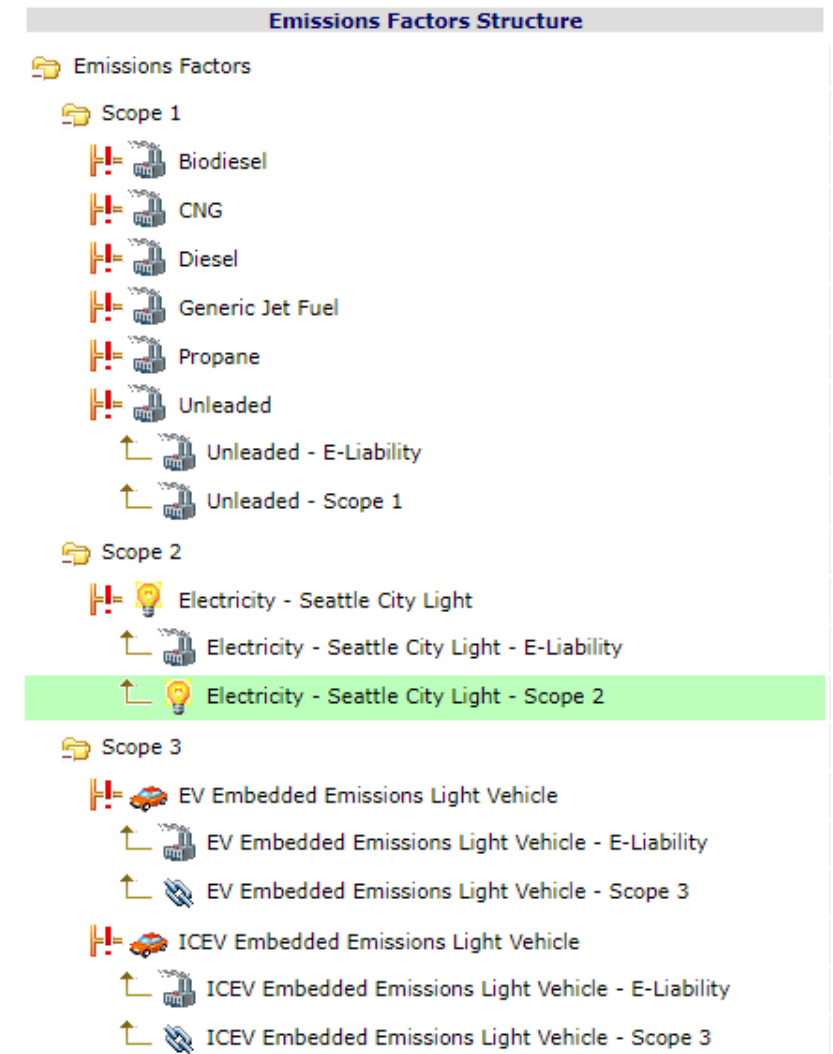
- Objective – to support the electrification of the County’s fleet:
 - 50% of light-duty by 2025 – 100% by 2030
 - 50% of medium-duty by 2028 – 100% by 2033
 - 50% of heavy-duty by 2038 – 100% by 2043
- What are current emissions and current cost?
- What will future emissions be and estimated future cost?
- Defined outputs – 3,000 vehicles grouped into Heavy, Medium, Light, Equipment, Motorcycle and Pursuit-rated
- Scopes defined
 - Scope 1 – Emissions from vehicles, Heating (Oil heaters)
 - Scope 2 – Electricity Consumption
 - Scope 3 – Key suppliers – Fuel, Parts, Vehicles
- Source Data for Costs and Metrics
 - Asset Management (supplies, tail pipe emissions)
 - Financial Management
 - HR / Payroll
 - Facilities Management (Electricity)

- The objective is to start with a high-level model but include all expenses and emissions as currently calculated.
- This allows us to reconcile both expenses and emissions.
- We also want to maximize the amount of raw data, particularly if it can be used in driver formulas, but minimize the number of manual allocations in the ABC model.
- We'll do this in the pilot model by keeping a core number of broad drivers and automate as much of the allocations as possible.
- This is the starting point. The model can be iteratively improved over time and more granular allocations developed, but always ensuring the model reconciles to the full expenses and emissions.

- All emissions factors are defined in the emissions factor module.
- Will include both E-Liability and GHG Protocol Scopes (1,2 and 3)
- This means the model can report just E-Liability or the Scopes as required for current reporting
- The pilot model currently includes Scope 1 and limited Scope 2 and Scope 3.



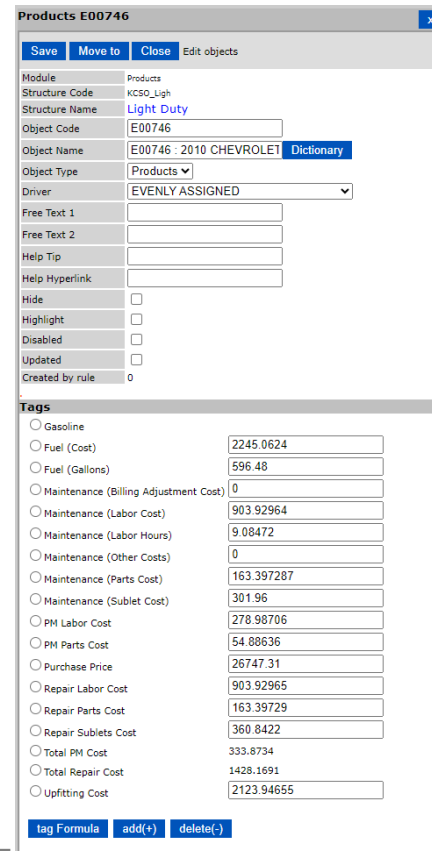
- Scope 1 Emissions Factors – Provided by Fleet Services
- Scope 2 Emissions Factors – Provided by Fleet Services
- Scope 3 Emissions Factors – Provided by University of Houston Embedded Emissions Calculator for EV and ICE - [UH ENERGY: EV/ICEV CO2e Emissions](#)



- All Financials for Fleet Services division included in the model

Resource Structure	Total Expense
Resource	\$33,230,225
EXECUTIVE SERVICES	\$33,230,225
FLEET MANAGEMENT	\$33,230,225
ADMINISTRATION	\$5,585,694
EQUIPMENT MAINTENANCE	\$6,825,581
ERANDR STOREKEEPERS	\$696,769
GENERAL ADMINISTRATION	\$6,079,561
M P STORES AND MATERIALS	\$57,759
MANUFACTURE OF MATERIALS	(\$39,286)
PERSONAL PROP ASSET MGMT	\$7,843
PERSONAL PROPERTY SURPLUS	\$581,796
REIMBURSABLES	\$227,618
REIMBURSABLES	\$136,526
VEHICLE MAINTENANCE	\$9,561,196
780003 ADMIN DEFAULT	\$862,668
FD 780003 MOTOR POOL	\$8,698,529
51110 : REGULAR SALARIED EMPLOYEE	\$816,264
51120 : TEMPORARY	\$3,799
51130 : OVERTIME	\$260
51143 : DUTY ASSIGNMENT	\$65
51144 : PAY DIFFERENTIAL PREMIUM	\$19,999
52221 : SUPPLIES VEHICLE	\$1,056,644
52224 : SUPPLIES FUEL GASOLINE	\$3,579,633

- All 3000+ Vehicles included in model
- Each vehicle has multiple metrics (tags) associated with them which can be used for Driver formulas.



Products E00746

Save Move to Close Edit objects

Module: Products
Structure Code: KCSO_Ligh
Structure Name: Light Duty
Object Code: E00746
Object Name: E00746 : 2010 CHEVROLET Dictionary
Object Type: Products
Driver: EVENLY ASSIGNED

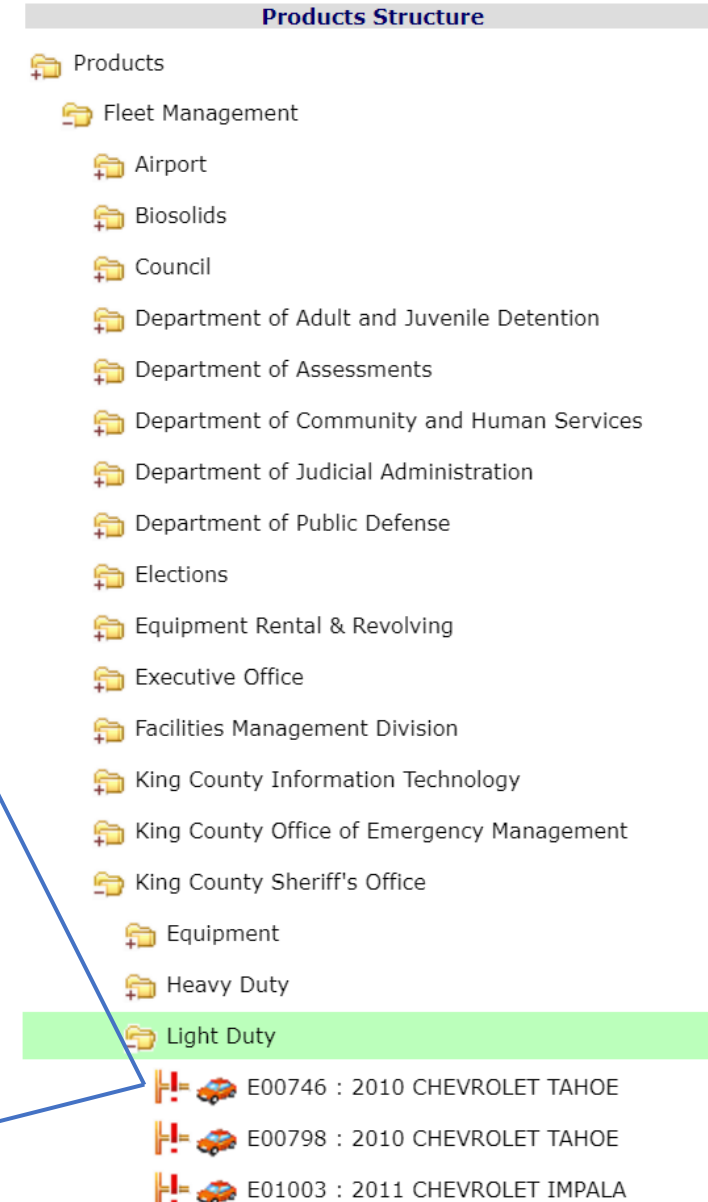
Free Text 1
Free Text 2
Help Tip
Help Hyperlink

Hide
Highlight
Disabled
Updated
Created by rule: 0

Tags

<input type="radio"/> Gasoline	
<input type="radio"/> Fuel (Cost)	2245.0624
<input type="radio"/> Fuel (Gallons)	596.48
<input type="radio"/> Maintenance (Billing Adjustment Cost)	0
<input type="radio"/> Maintenance (Labor Cost)	903.92964
<input type="radio"/> Maintenance (Labor Hours)	9.08472
<input type="radio"/> Maintenance (Other Costs)	0
<input type="radio"/> Maintenance (Parts Cost)	163.397287
<input type="radio"/> Maintenance (Sublet Cost)	301.96
<input type="radio"/> PM Labor Cost	278.98706
<input type="radio"/> PM Parts Cost	54.88636
<input type="radio"/> Purchase Price	26747.31
<input type="radio"/> Repair Labor Cost	903.92965
<input type="radio"/> Repair Parts Cost	163.39729
<input type="radio"/> Repair Sublets Cost	360.8422
<input type="radio"/> Total PM Cost	333.8734
<input type="radio"/> Total Repair Cost	1428.1691
<input type="radio"/> Upfitting Cost	2123.94655

tag Formula add(+) delete(-)



Products Structure

- Products
 - Fleet Management
 - Airport
 - Biosolids
 - Council
 - Department of Adult and Juvenile Detention
 - Department of Assessments
 - Department of Community and Human Services
 - Department of Judicial Administration
 - Department of Public Defense
 - Elections
 - Equipment Rental & Revolving
 - Executive Office
 - Facilities Management Division
 - King County Information Technology
 - King County Office of Emergency Management
 - King County Sheriff's Office
 - Equipment
 - Heavy Duty
 - Light Duty**
 - E00746 : 2010 CHEVROLET TAHOE
 - E00798 : 2010 CHEVROLET TAHOE
 - E01003 : 2011 CHEVROLET IMPALA

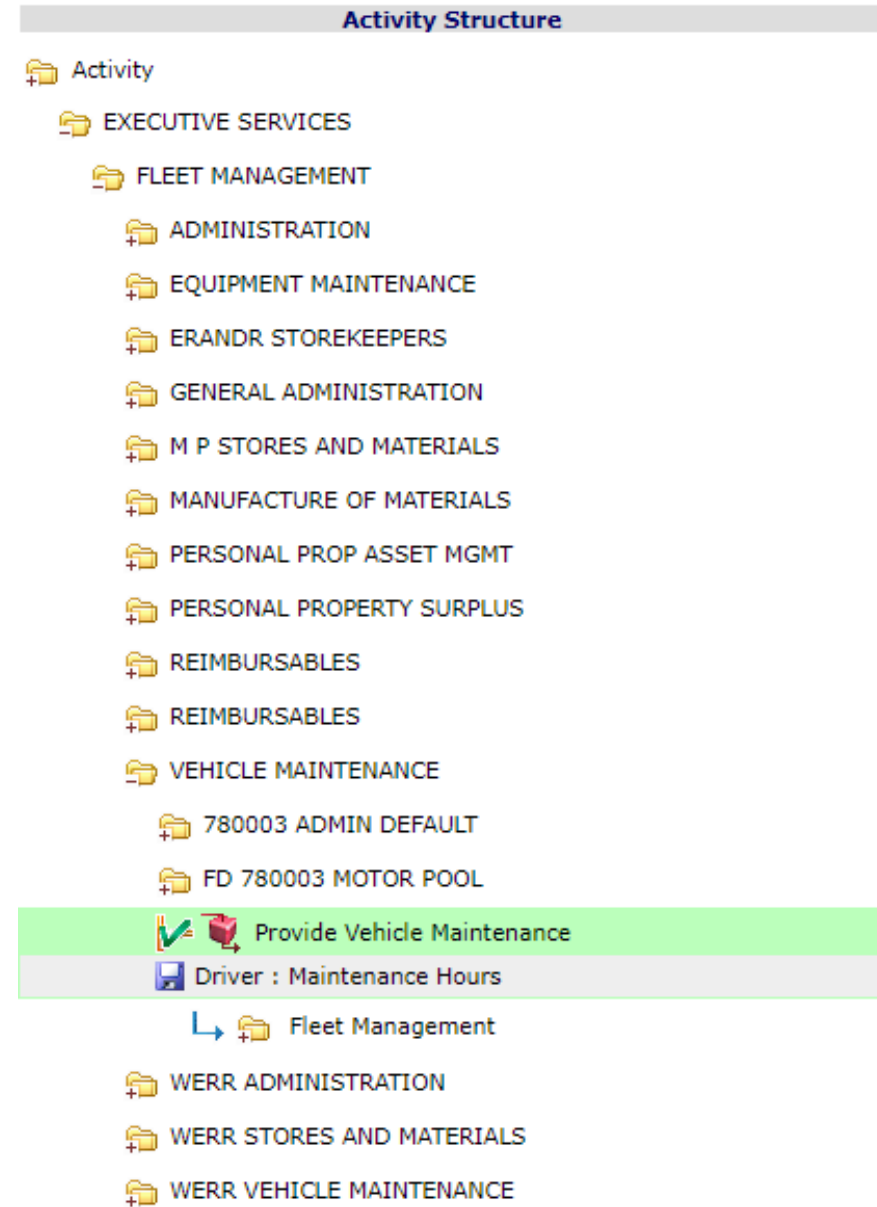
- Each vehicle has planned maintenance and repair costs broken out.

<input type="radio"/> PM Parts Cost	54.88636
<input type="radio"/> Purchase Price	26747.31
<input type="radio"/> Repair Labor Cost	903.92965
<input type="radio"/> Repair Parts Cost	163.39729
<input type="radio"/> Repair Sublets Cost	360.8422
<input type="radio"/> Total PM Cost	333.8734
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Products Structure

- Products
 - Fleet Management
 - Airport
 - Biosolids
 - Council
 - Department of Adult and Juvenile Detention
 - Department of Assessments
 - Department of Community and Human Services
 - Department of Judicial Administration
 - Department of Public Defense
 - Elections
 - Equipment Rental & Revolving
 - Executive Office
 - Facilities Management Division
 - King County Information Technology
 - King County Office of Emergency Management
 - King County Sheriff's Office
 - Equipment
 - Heavy Duty
 - Light Duty**
 - E00746 : 2010 CHEVROLET TAHOE
 - E00798 : 2010 CHEVROLET TAHOE
 - E01003 : 2011 CHEVROLET IMPALA

- High Level Activities as the first pass of the model.



- High Level Drivers developed
- The Driver will automatically find the appropriate object to allocate to and calculate the appropriate amount for this allocation.
- In this example: Biodiesel Emissions Driver will search for and only allocate to Vehicles with the Biodiesel tag and the amount will be calculated by multiplying the emissions factor by the number of gallons of biodiesel used.
- This reduces the number of manual allocations, because the emissions factor only needs to be allocated **once**, to the top of the Products (Vehicles) hierarchy, using the Biodiesel Emissions Driver and driver will do the rest of the work.

	Name	Driver Type	Method	Phase	Formula	Roll Over Driver	Filter	links
	Biodiesel Emissions	Formula ▾	Multiplier ▾	0	"Biodiesel (Gallons)" * "tagExists"."Biodiesel"	<input type="text"/>		
	CNG Emissions	Formula ▾	Multiplier ▾	0	"Fuel (Gallons)" * "tagExists"."Compressed Natural Gas"	<input type="text"/>		

- Reports can include expenses and emissions per Department



Department

Airport	Department of Adult and Juvenile Detent...	Department of Judicial Administration	Equipment Rental & Revolving	King County Information Technology	Marine	Parks	Public Health
Biosolids	Department of Assessments	Department of Public Defense	Executive Office	King County Office of Emergency Ma...	Motor Pool	Permitting	Records and Licensing Services
Council	Department of Community and Human Services	Elections	Facilities Management Division	King County Sheriff's Office	MP Dispatch	Prosecuting Attorney	Roads

Level3	Total Expense	E-Liability	Scope 1
Pursuit-rated	\$5,226,536.58	4,681.56	4,681.56
Equipment	\$4,511,777.31	218.44	218.44
Light Duty	\$2,946,479.73	2,130.74	2,130.74
Equipment	\$2,810,052.45	26.09	26.09
Light Duty	\$1,695,228.91	1,419.16	1,419.16
Light Duty	\$1,552,654.60	438.65	438.65
Heavy Duty	\$1,491,027.51	1,408.36	1,408.36
Equipment	\$1,369,801.36	0.00	0.00
Light Duty	\$1,246,807.05	785.69	785.69
Light Duty	\$1,213,911.37	462.43	462.43
Medium Duty	\$1,197,614.49	661.47	661.47
Equipment	\$872,370.10	0.82	0.82
Total	\$33,230,224.63	15,207.39	15,207.39

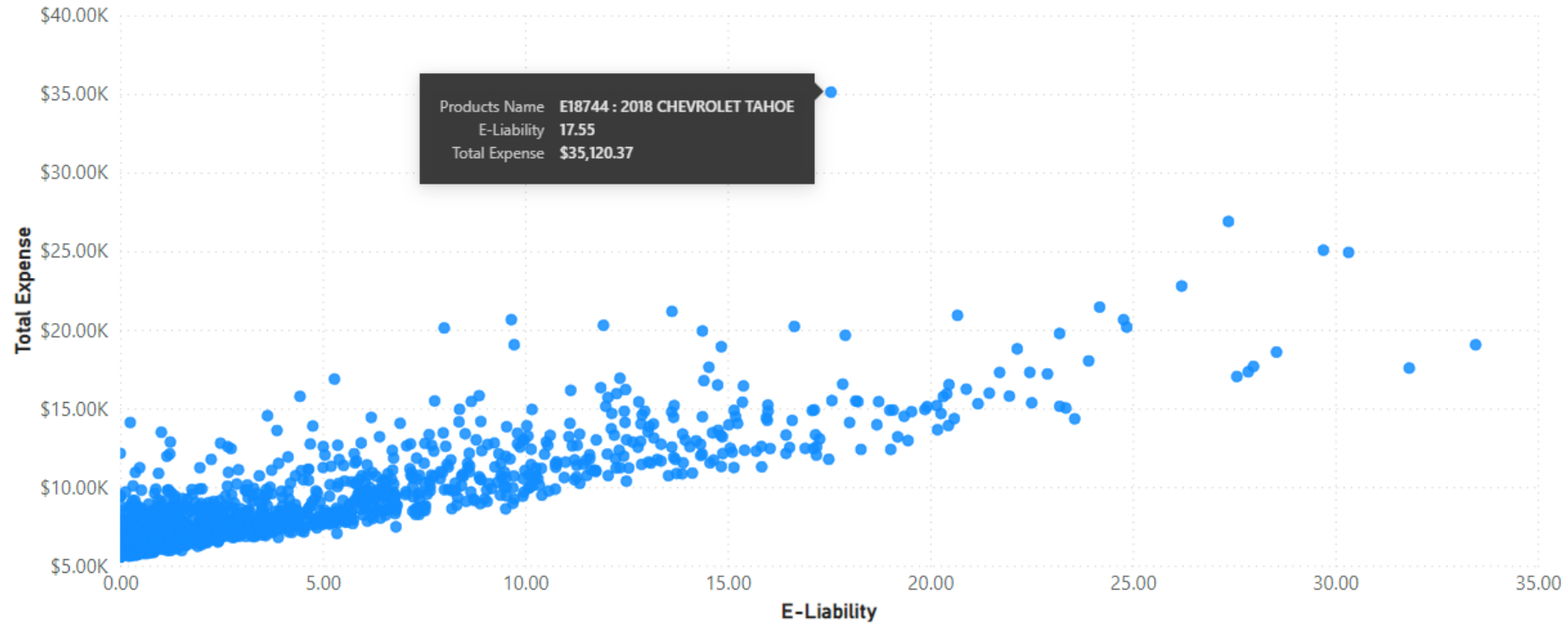
- Expense and Emissions per Vehicle



Vehicle Type

Equipment	Light Duty	Motorcycle	Utility Vehicle
Heavy Duty	Medium Duty	Pursuit-rated	

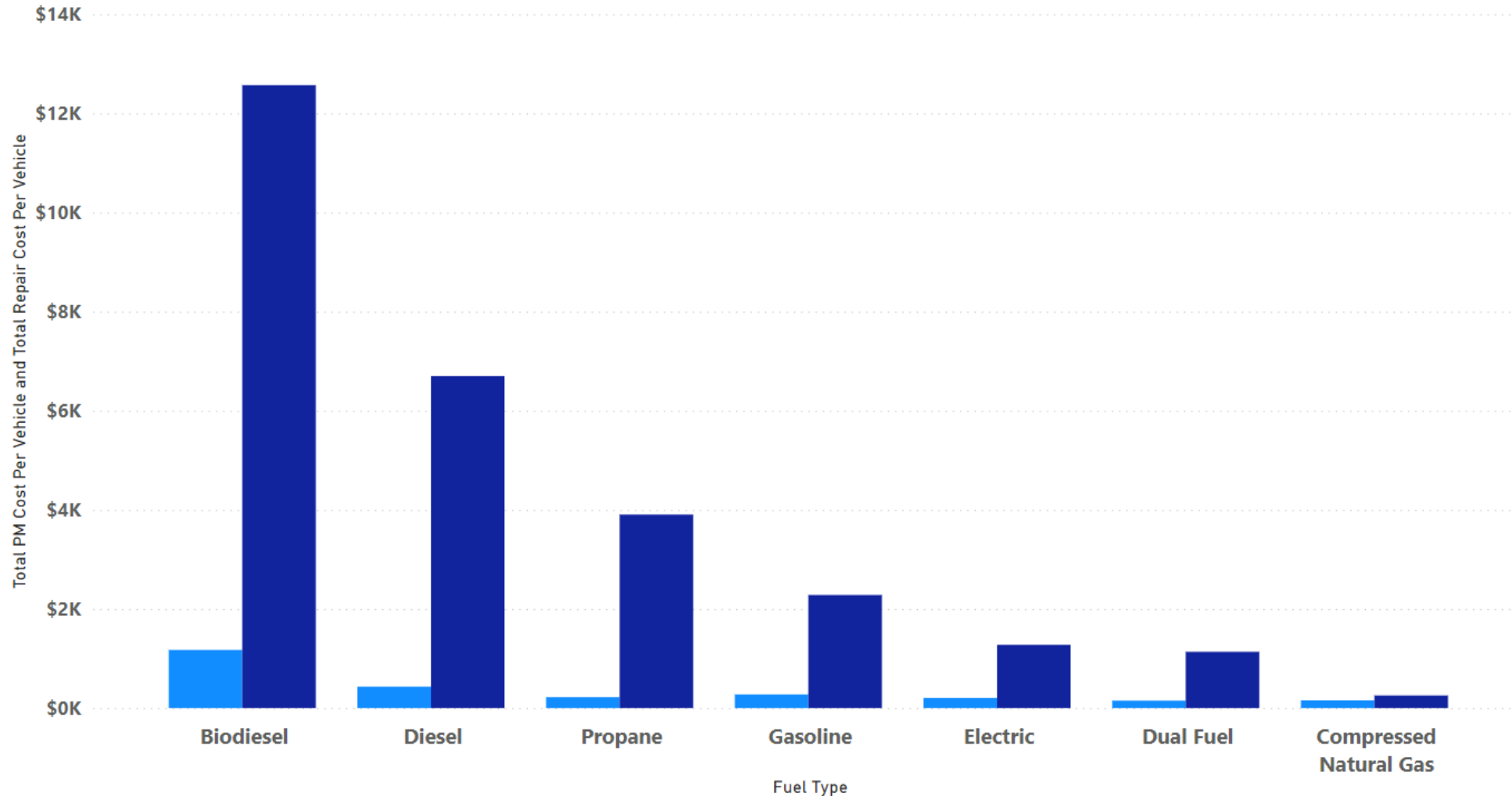
E- LIABILITY and Total Expense by Products Name



- Total Planned Maintenance Cost and Total Repair Cost per Vehicle by Fuel Type

Total PM Cost Per Vehicle and Total Repair Cost Per Vehicle by Fuel Type

● Total PM Cost Per Vehicle ● Total Repair Cost Per Vehicle



- Source data on Electricity consumption and provider from Facility Management – investigate Hydro Power – any embedded emissions to include?
- Request embedded emissions per vehicle from manufacturers and use an amortized emissions factor.
- Compare ICE and EV total costs and total carbon emissions to support future decision making.
- Investigate charging infrastructure cost.
- Investigate the difference between battery life and vehicle life. At the moment not enough data in King County model.

Are you interested in starting something?

- Review the [E-Liability Pilot Adoption documentation](#)
- If you already have an ABC model, add in Emissions data.
- If you don't know what an ABC model is, speak to the CAM-I folk.
- Start simply and quickly.
- If you need help please reach out to CAM-I, E-Liability Team or Pilbara. You can also join CAM-I and the Environmental Sustainability Interest Group.

- [Pilbara Group Whitepaper - Environmental Sustainability using ABC](#)
- [Accounting for Climate Change \(hbr.org\)](#)
- [Accounting for Carbon Offsets \(hbr.org\)](#)

CASE STUDIES

Tata Steel

[Issue 4- Accountability in a Sustainable World Quarterly, September 2023 \(fliphtml5.com\)](#)

[Update on E liability Accounting Panel ASW2023 \(youtube.com\)](#)

Hitachi Energy

[Why Recycled Materials Don't Always Generate Greener Products \(hbr.org\)](#)

Time is running out!

**Focus on Reduction not just
Reporting!**

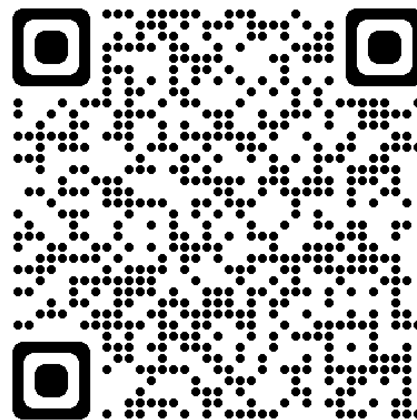
**The transition needs to be
managed properly!**

**Just start, quickly, simply and
iteratively improve.**

Thank you

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Chauntelle Hellner - chauntelle.hellner@kingcounty.gov



<https://www.pilbaragroup.com/environmental-insights/>