CONNEQT

Seeq Analytics Role in a Comprehensive Life Cycle Assessment

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SITE SUSTAINABILITY LEAD
SYNGENTA

Sustainability Challenge

Syngenta is a leading agriculture company helping to improve global food security by enabling millions of farmers to make better use of available resources

Sustainability is part of everything we do – from developing innovative products that help farmers grow more from less to controlling the impact of our operations

St. Gabriel Site Solution

By lowering the emissions from our own production sites and those of our entire supply chain we are adding to our efforts towards carbon neutral agriculture

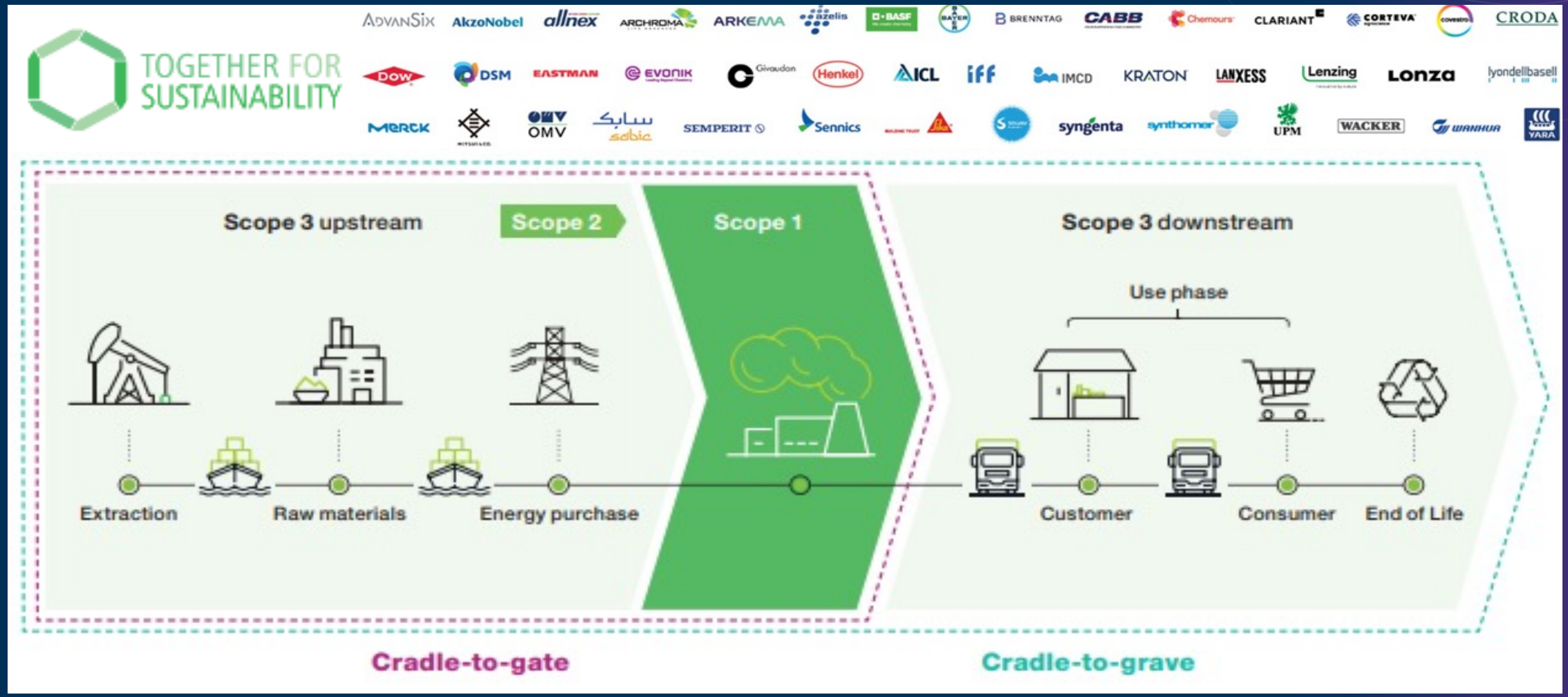
Our goal is making our own operations less carbon-intensive

SOLUTION

Working with consultant **Sphera** and using **Seeq** to provide production data, St. Gabriel is performing

Life Cycle Assessments

What is Life Cycle Assessment (LCA)?



LCA Boundaries figure from 'The Product Carbon Footprint Guideline for the Chemical Industry'
Together for Sustainability document for Carbon Footprint Accounting & Reporting available @ www.tfs-initiative.com

Site Carbon Footprint

Lead by consultant Sphera, St. Gabriel is completing a 'Cradle to Gate' **Life Cycle Assessment.**

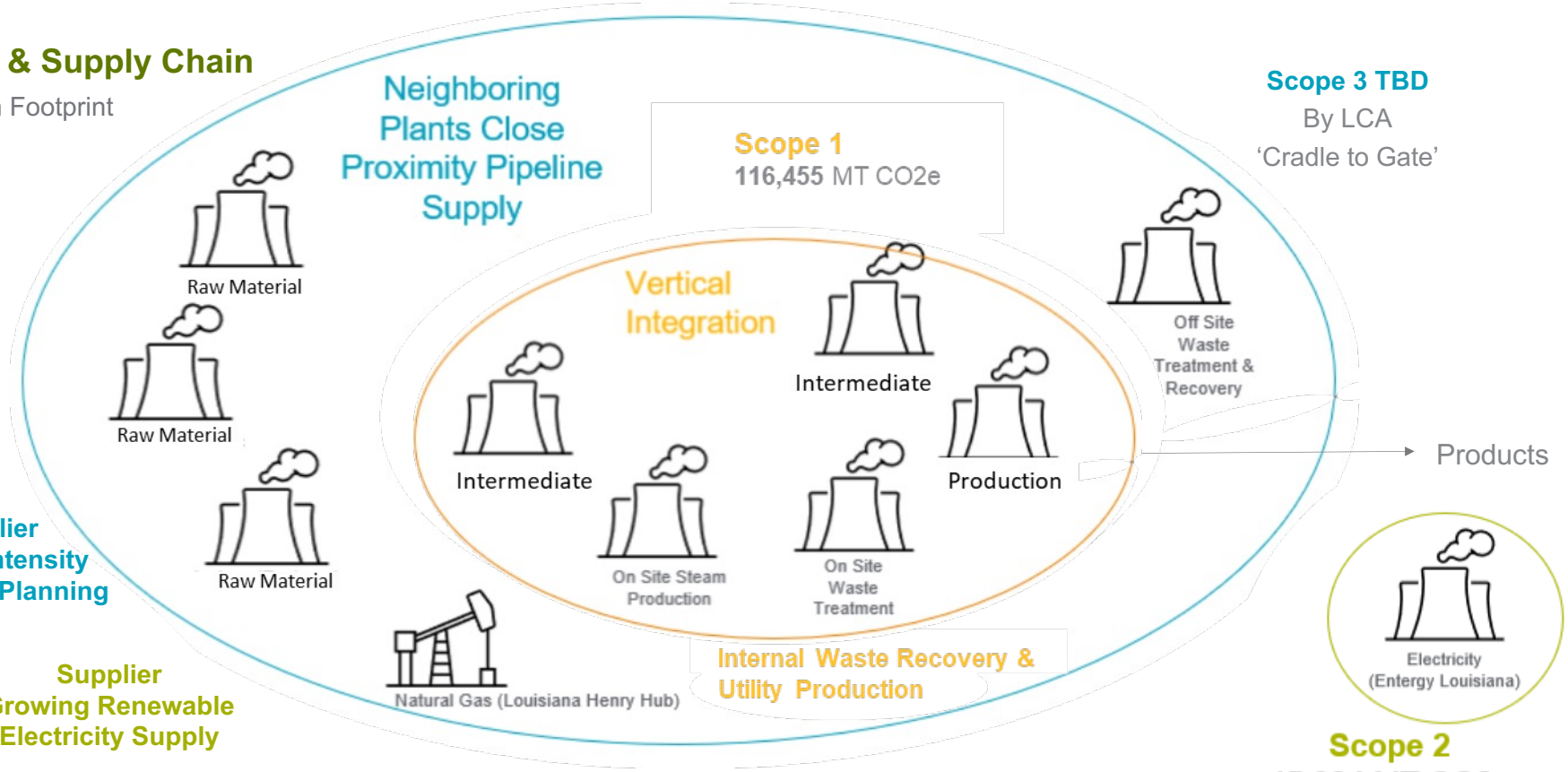
This analysis looks both upstream and downstream of production considering Raw Materials & Waste.

St. Gabriel Production & Supply Chain

Scope 1 & **Scope 2** Carbon Footprint

162,359 MT CO2e

Largest of Sites



Scope 3 TBD

By LCA

'Cradle to Gate'

Supplier Carbon Intensity Reduction Planning

Supplier Growing Renewable Electricity Supply

Scope 2

45,904 MT CO2e

Life Cycle Assessment Methodology

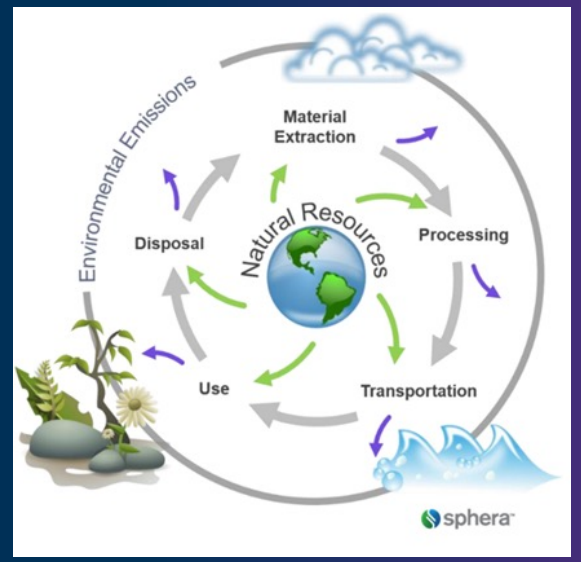
LCA methodology used is based on
- European methodology Environmental Footprint v3.0 (EF 3.0)
- LCA Standards - ISO 14044 and ISO 14067

Methodology covers a number of impact categories

Syngenta's Sustainability Goals are for
- Carbon Footprint reduction (50%)
- Water & Waste reduction (20%)

Our LCA project modeled Global Warming Potential (GWP) (Carbon Footprint) following this methodology.

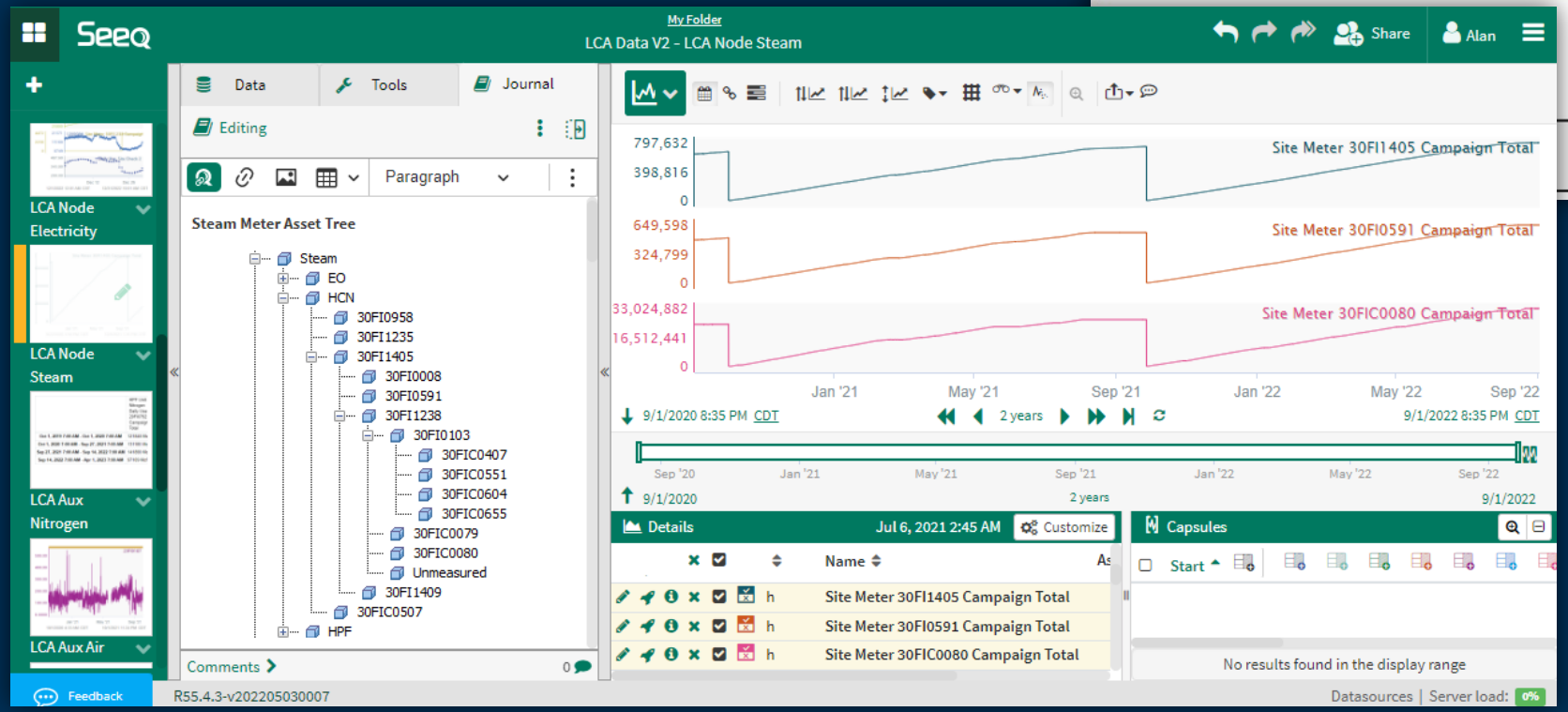
Formal report and 3rd Party review is required by standards.
Syngenta project results are internal use as this validation step not yet completed. Results shared in this presentation are examples only, not actual values, and no claim conformance with ISO 14044 and ISO 14067.



Data Types & Sources

Inputs & Outputs to the Process are categorized

INPUTS	OUTPUTS
Raw Materials / Pre-Cursors	Products / Intermediate Products / Side-Products and Waste Flows
Water Use	Waste for recovery
Auxilliaries	Waste for incineration
Electricity	Waste for landfill
Steam and Thermal Energy	Water Output
	Emissions to Water
	Emissions to Air



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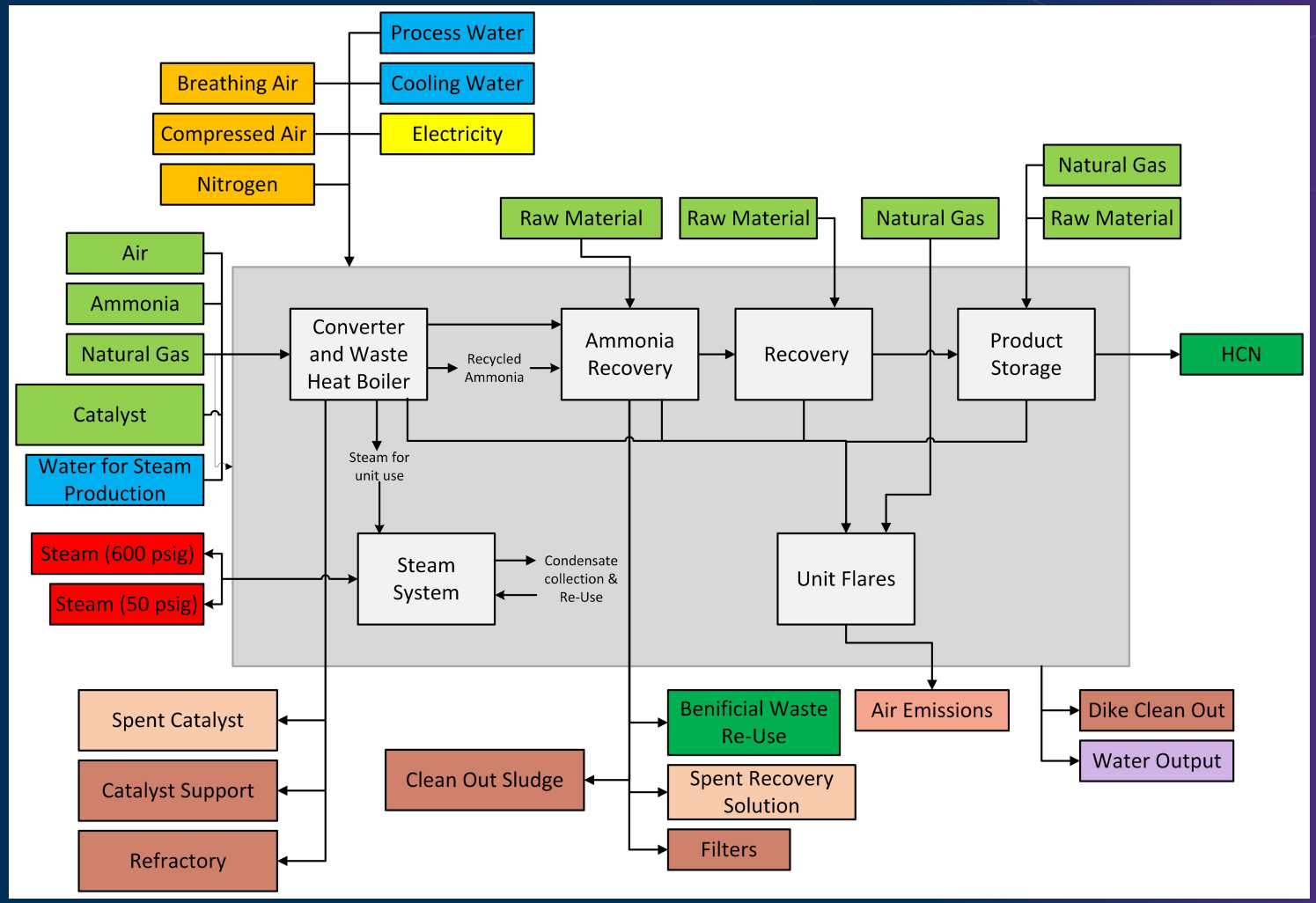
Process Nodes

Process is broken into nodes for granularity

LCA Model built from Nodes

Inventory taken for each input & output for individual nodes



Example Node – Intermediate Production Unit

Seeq Use in LCA Process

Seeq capsules & conditions are set for LCA collection periods.

Meters and calculations for inputs and outputs are easily rolled-up for each node in the model.

Seeq gathers large number of data points and easily pulls into categories by type & Nodes.

501 Data Points

Make up our Carbon Footprint in the LCA Model

Data Quality = LCA Quality

The quality of an LCA is calculated. Standards require formal calculations for larger components as well as assess over all data sources.

Seeq pulls measured data for best quality assessment.

TOGETHER FOR SUSTAINABILITY

Data quality rating (DQR)
During the data collection process, companies shall assess the data quality of activity data, emission factors, and/ or direct emissions data by using the data quality indicators.

Table 5.18 Data quality assessment used in TfS and [Pathfinder Framework (PACT powered by WBCSD)]

DQI	1 - Good	2 - Fair	3 - Poor
Technology	Same technology	Similar technology (based on secondary data)	Different or unknown technology
Time	Data from reporting year	Data less than 5 years old	Data more than 5 years
Geography	Same country or country subdivision	Same region or subregion	Global or unknown
Completeness	All relevant sites for specified period	<50% of sites for specified period or >50% of sites for shorter period	Less than 50% of sites for shorter time period or unknown
Reliability	Measured activity data	Activity data partly based on assumptions	Non-qualified estimate

Best quality data is from measured source.

Part of the exercise is determining where better metering or measurement source is needed.

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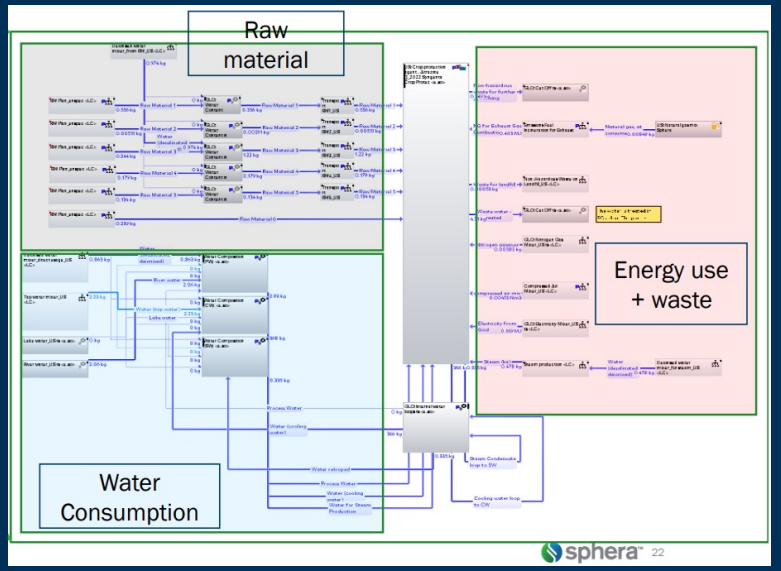
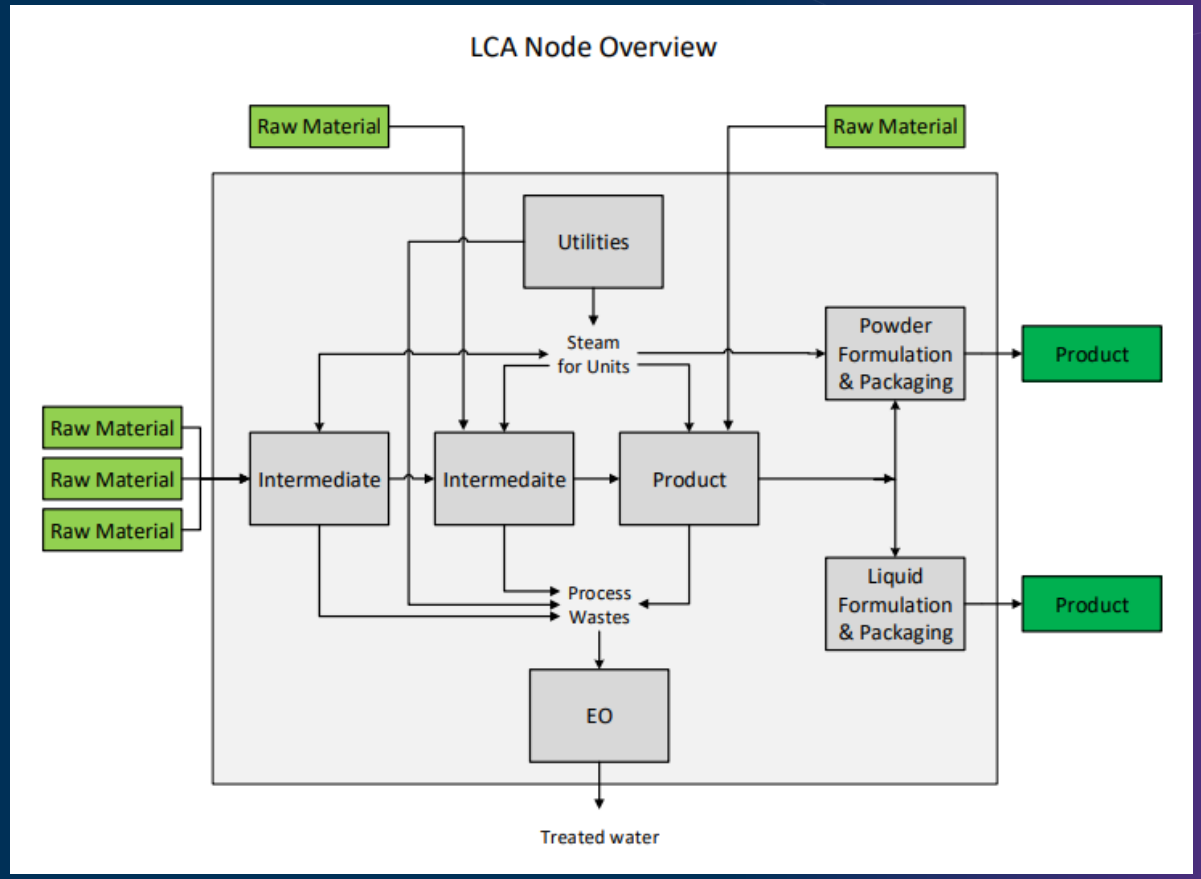
Putting it together

Individual Nodes are compiled together to make up the Products overall Life Cycle.

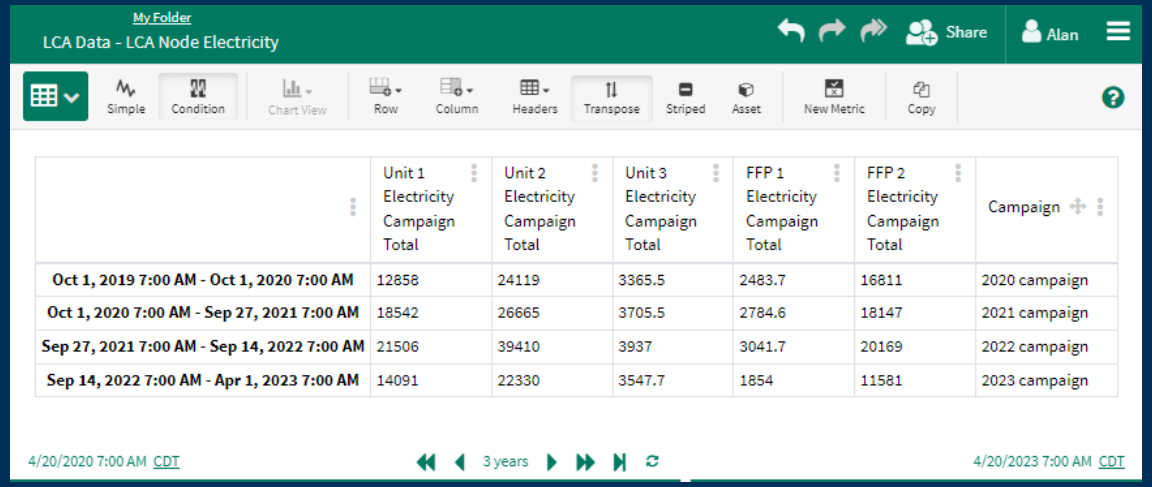


Example Node in Sphera GaBi Product Model

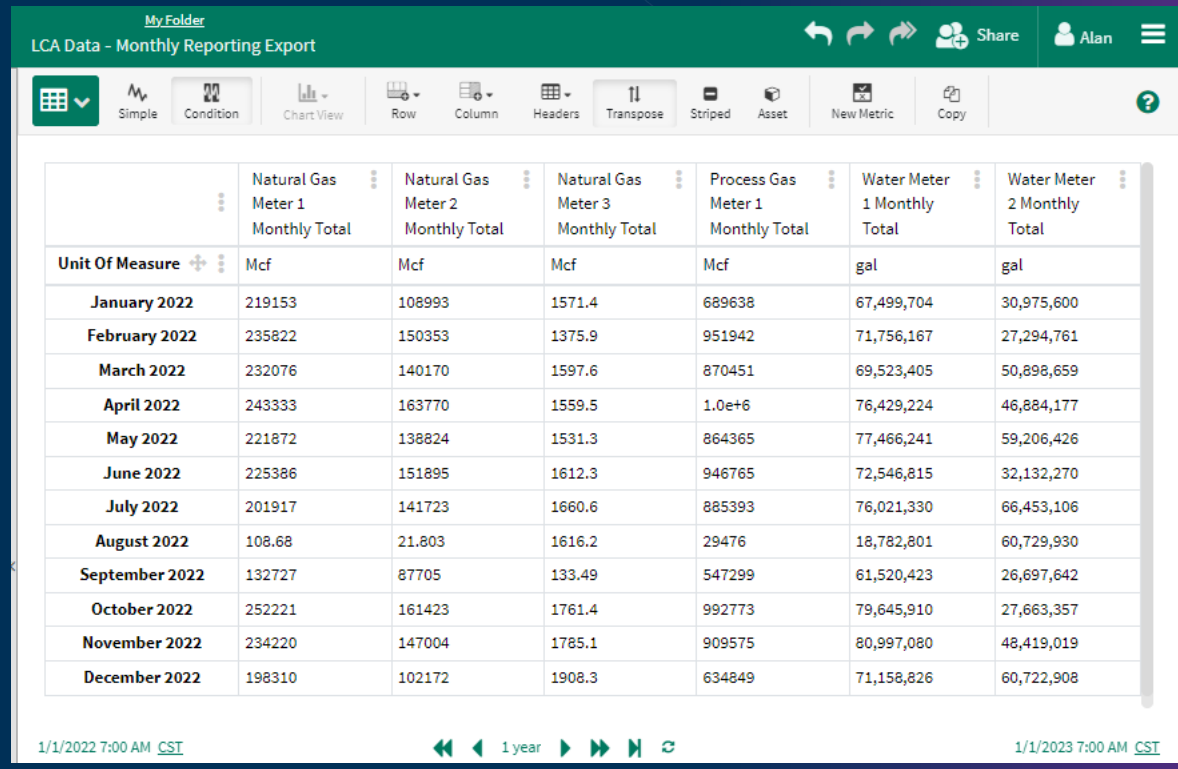


Seeq Data Export Example

Seeq measured process data was exported for the model which then uses Sphera databases to match components with their carbon intensities.



	Unit 1 Electricity Campaign Total	Unit 2 Electricity Campaign Total	Unit 3 Electricity Campaign Total	FFP 1 Electricity Campaign Total	FFP 2 Electricity Campaign Total	Campaign
Oct 1, 2019 7:00 AM - Oct 1, 2020 7:00 AM	12858	24119	3365.5	2483.7	16811	2020 campaign
Oct 1, 2020 7:00 AM - Sep 27, 2021 7:00 AM	18542	26665	3705.5	2784.6	18147	2021 campaign
Sep 27, 2021 7:00 AM - Sep 14, 2022 7:00 AM	21506	39410	3937	3041.7	20169	2022 campaign
Sep 14, 2022 7:00 AM - Apr 1, 2023 7:00 AM	14091	22330	3547.7	1854	11581	2023 campaign



	Natural Gas Meter 1 Monthly Total	Natural Gas Meter 2 Monthly Total	Natural Gas Meter 3 Monthly Total	Process Gas Meter 1 Monthly Total	Water Meter 1 Monthly Total	Water Meter 2 Monthly Total
Unit Of Measure	Mcf	Mcf	Mcf	Mcf	gal	gal
January 2022	219153	108993	1571.4	689638	67,499,704	30,975,600
February 2022	235822	150353	1375.9	951942	71,756,167	27,294,761
March 2022	232076	140170	1597.6	870451	69,523,405	50,898,659
April 2022	243333	163770	1559.5	1.0e+6	76,429,224	46,884,177
May 2022	221872	138824	1531.3	864365	77,466,241	59,206,426
June 2022	225386	151895	1612.3	946765	72,546,815	32,132,270
July 2022	201917	141723	1660.6	885393	76,021,330	66,453,106
August 2022	108.68	21.803	1616.2	29476	18,782,801	60,729,930
September 2022	132727	87705	133.49	547299	61,520,423	26,697,642
October 2022	252221	161423	1761.4	992773	79,645,910	27,663,357
November 2022	234220	147004	1785.1	909575	80,997,080	48,419,019
December 2022	198310	102172	1908.3	634849	71,158,826	60,722,908

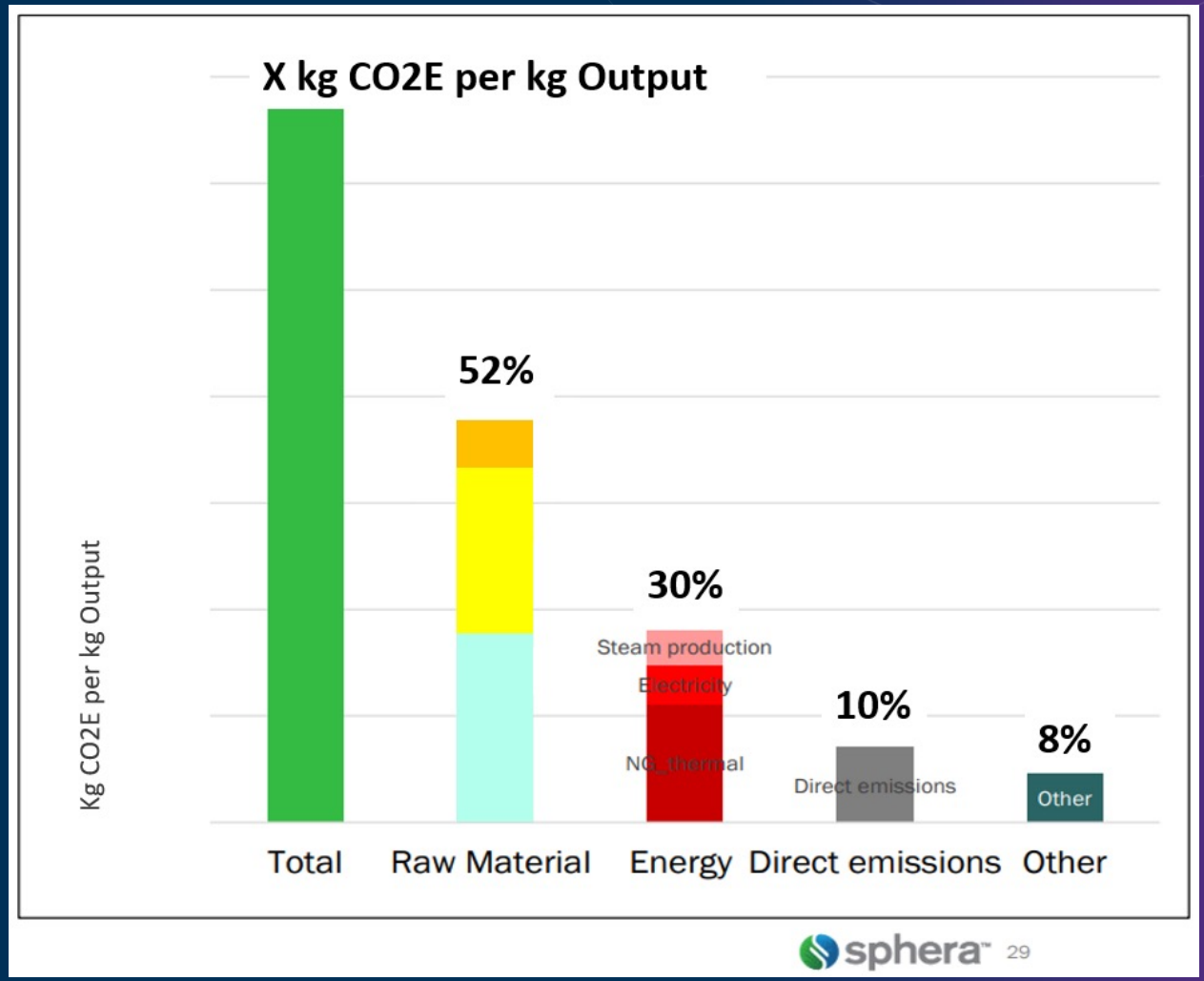
Results

LCA Results provide a detailed look at the products carbon footprint make-up.

Largest Contributors

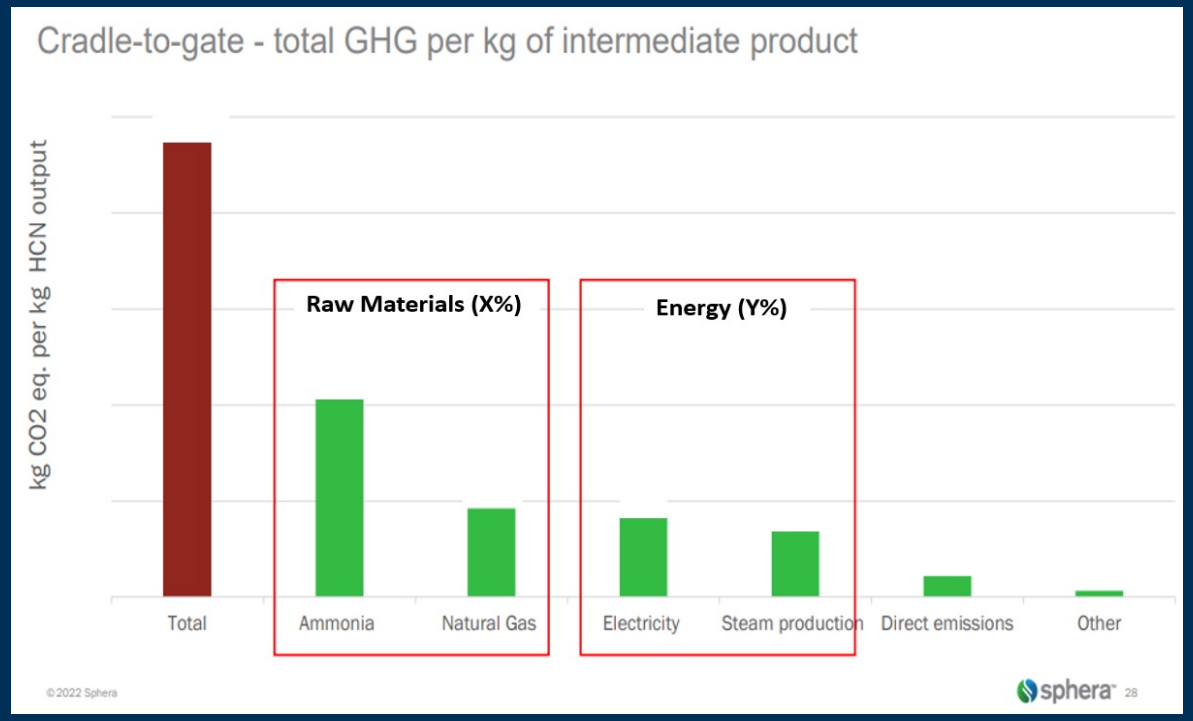
Intensity values of components

Overall Product ‘Craddle to Gate’ Scope 3 vs Production Site (Scope 1 & 2)



Seeq Role in Results (Beyond the Model)

Driving Change
Site Sustainability Strategy
Moving from Lagging to Leading

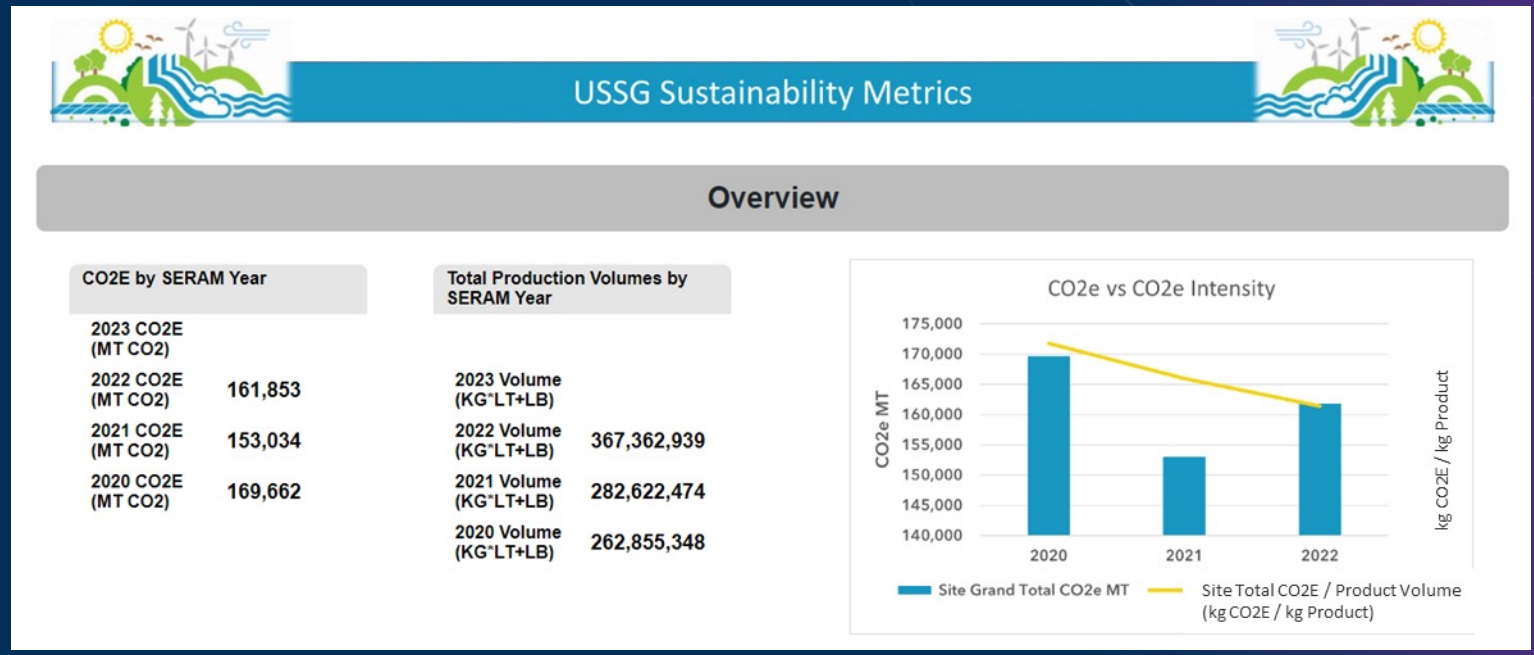


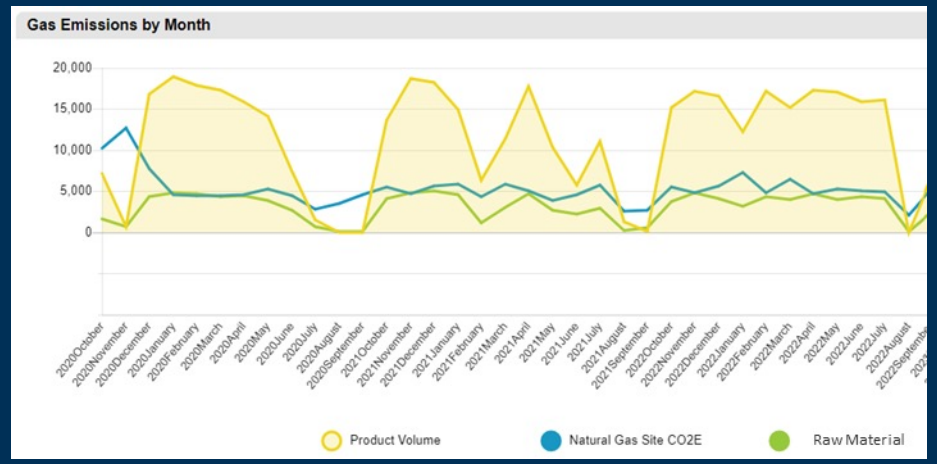
Dashboard Use

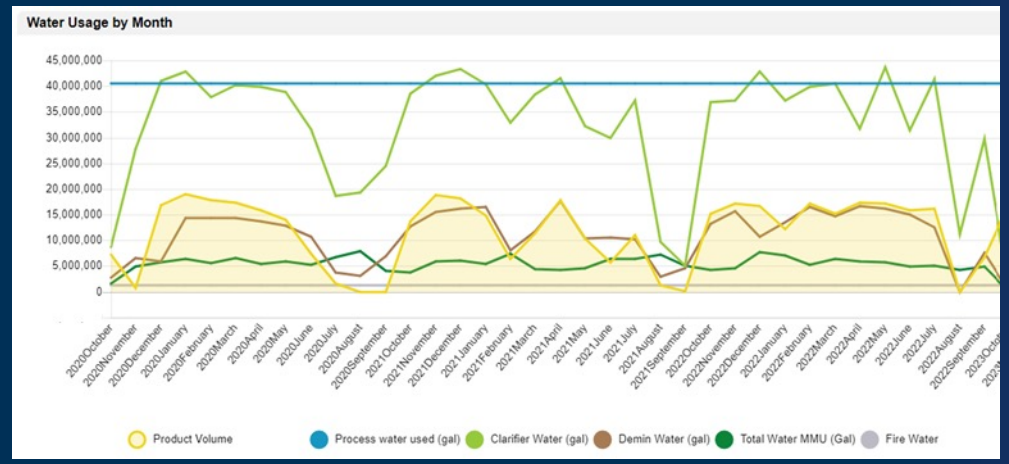
Growing Monthly Key Performance Indicators

Energy, Emissions, Water, and Waste

Absolute & Intensity







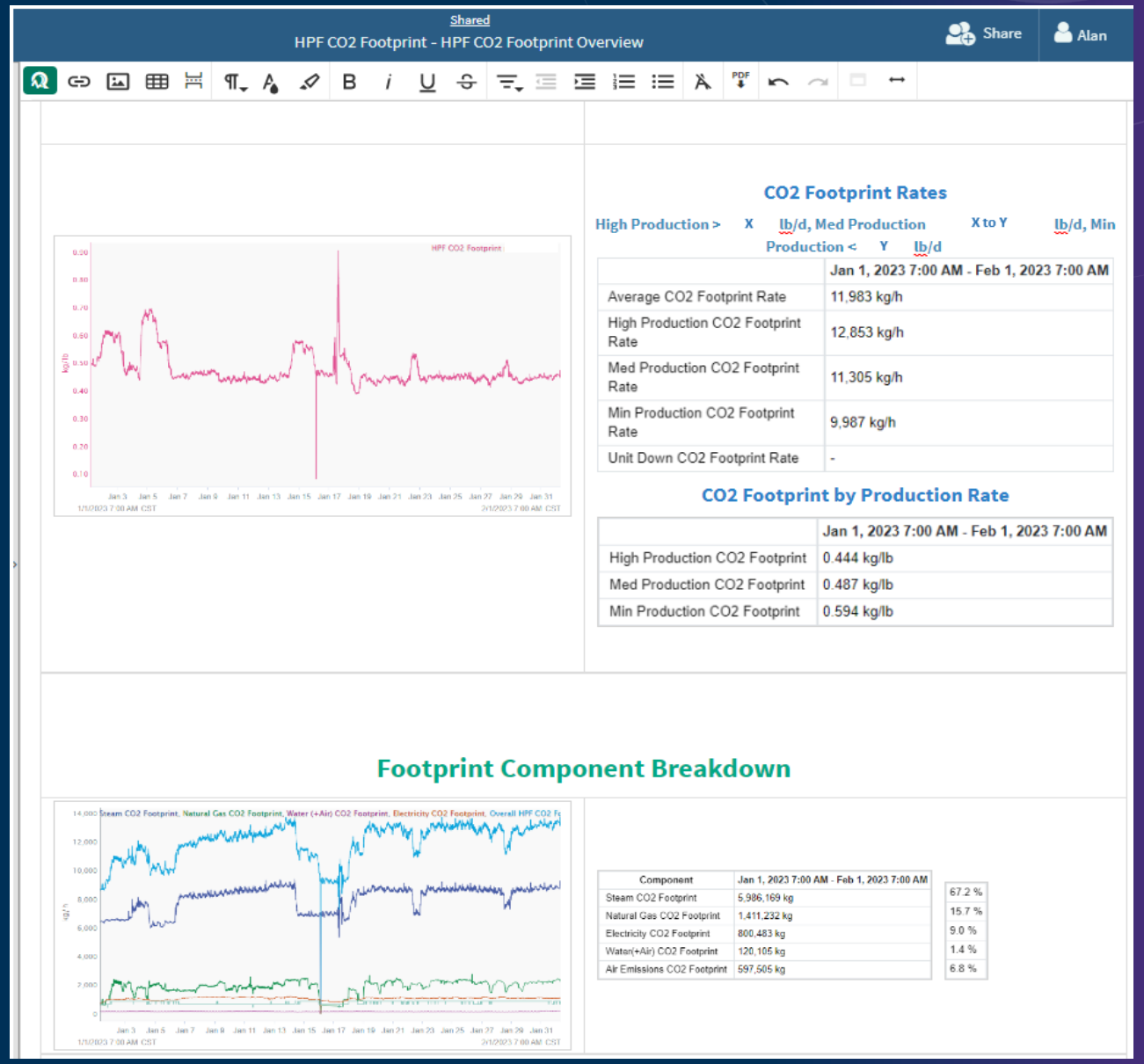
Control Room Use

Bringing Sustainability metrics to Control Room

Categories in terms of CO2e

Rate & OEE Impact

Top Drivers

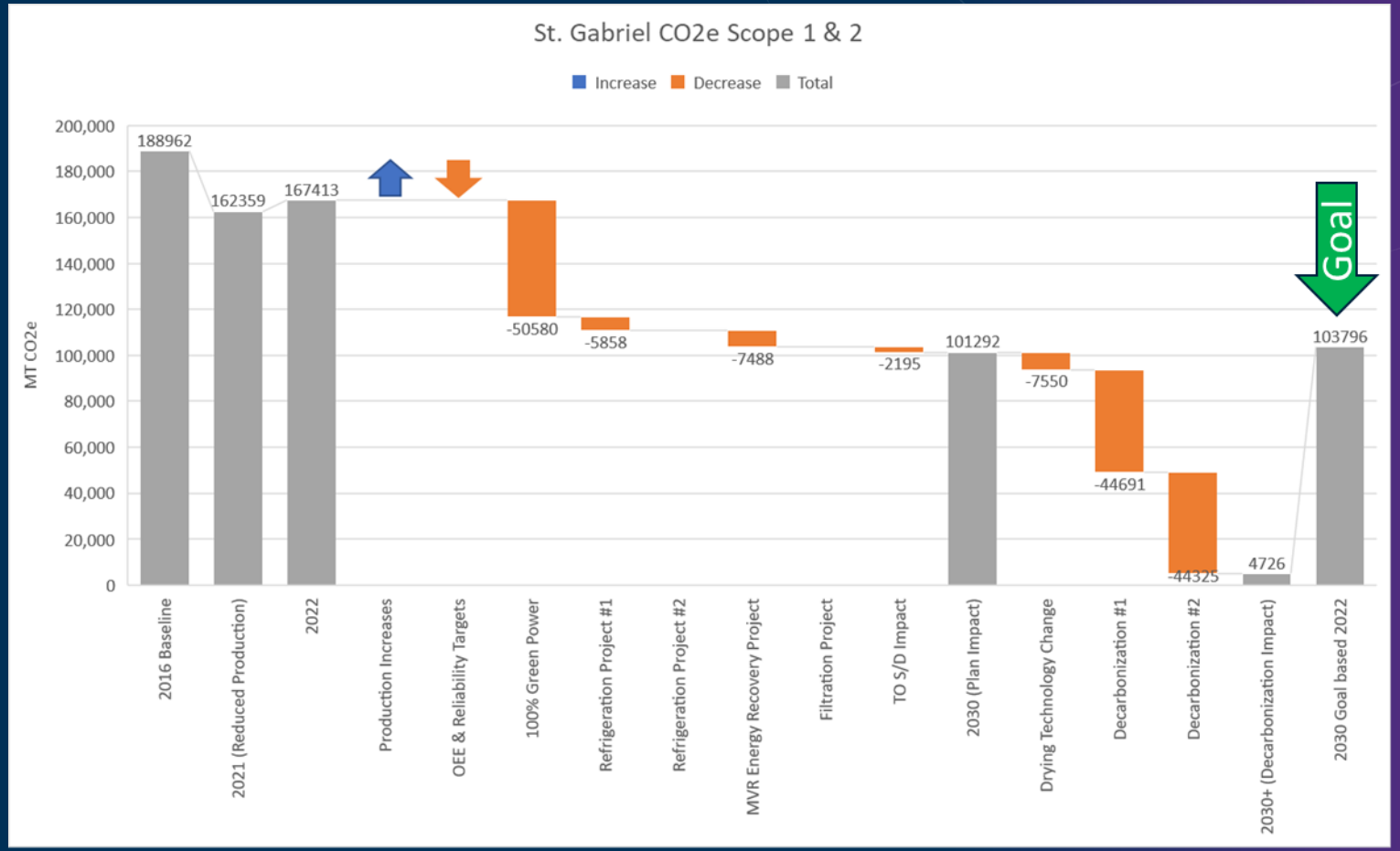


Evaluating Plan

Learning improves Project & Initiative Assessment

Evaluate impacts towards Sustainability Goals

Locate New Opportunities



What If?

Summary / Conclusion

CHALLENGE

Syngenta is committed to Sustainable Agriculture and making our own operations less carbon-intensive

SOLUTION

Seeq compiles & provides process data to power Life Cycle Assessment (LCA)

RESULTS

LCA enables visibility of opportunity, learning improves KPIs to drive efficiency & shape strategy, assessment provides capability to evaluate impacts

Questions ?
&
Thank you