Functional Documentation - CERISE

1.0 Overview

CERISE Menu

Cerise (Co2 Energy Report Improvement Software Efficiency) has been launched end of 2019 and implemented in 2020/2021; the aim of the project is to provide Solvay with:

- A robust and simple reporting solution, giving a detailed view of **energy consumption/expenses and CO2 emissions**
- An automated solution to manage ETS (European Trading Scheme) exposition for all sites concerned in Europe (~30 registers), giving a projection of EUA (EU Allowances) balance for 10 years, to be able to decide the right time to hedge EUAs on the market

Application User Profile

Key profiles:

HSE experts

Group reporting on CO2 emission

Target Users:

Energy & CO2 Reporting Officer

VERSION	DATE	MODIFIED BY	DESCRIPTION
0.01	27.11.2023	Emma Glasson	Initial draft

Application Type

Data Product Type	☐ Dashboard ☑ Report ☐ Advanced analytics ☐ AI ☐ Others <specify which one>
Technologies	☑ BW ☐ Tableau ☐ Qliksense ☐ Talend ☐ Dataiku ☐ Others <specify which one>
Data Sources *Note: list of all applications and various environment*	☑ SAP PF1 (Production environment) ☑ SAP WP1 ☐ SAP PI1 ☐ BW (versions) ☐ iCare CRM ☐ CORE CRM ☑ Others - Flat files

2.0 Business Processes

BW transaction ZECO2:

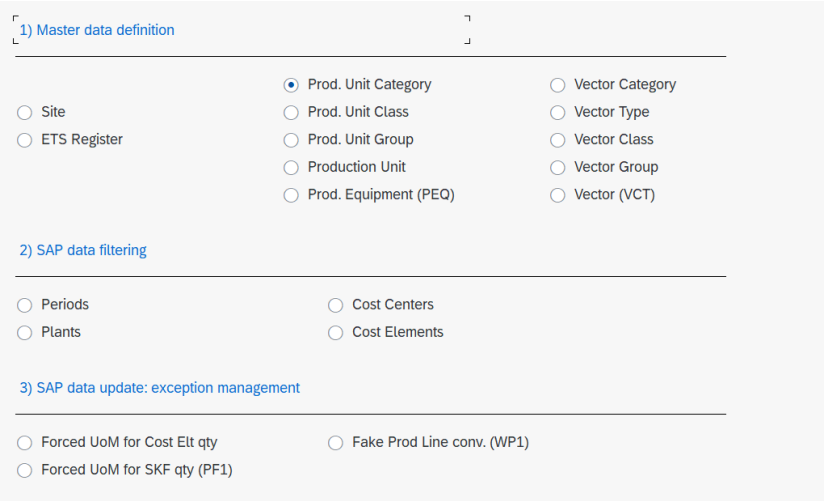
The purpose of this transaction in BW is to be able to manage following situations by the Energy expert:

Case 1: for SAP Sites, completion of data with entries not managed by technical flows put in place in Cerise solution (ex. sales of Energy)

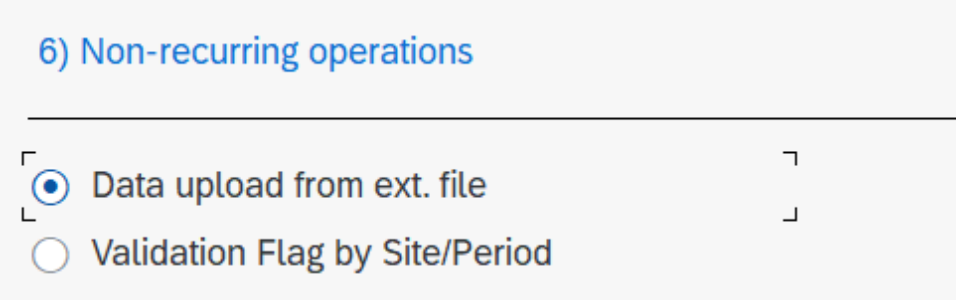
Case 2: for SAP Sites, correction of data updated from SAP sources by increasing/decreasing amounts/quantities

Case 3: for non SAP Sites, entry of all data relevant for Energy/CO2 follow up

Data have to be entered at following level: ProdEquipt / Vector / Prod/Cons. indicator / Period
If several periods are entered as an interval, input amounts/qties are divided for reporting by the number of corresponding periods; ex. if 1 200 is entered for 01.2020 to 12.2020 (i.e. 12 periods), 100 is saved for each period
Key figures (amount and/or qty) have to be updated with their UoMs:
Both can be entered as positive or negative values

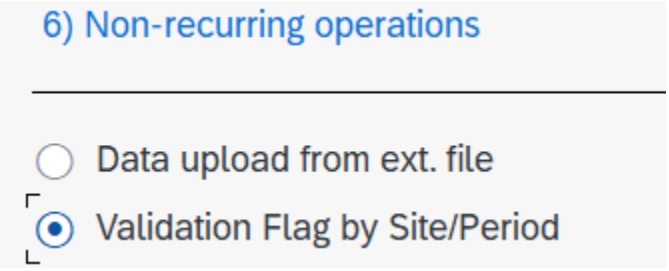


Warning: Production increase (stored as a negative value) has to be entered as a positive value / Production decrease (stored as a positive value) has to be entered as a negative value
Input quantities/UoMs are converted in standard UoM like other SAP data (see above SAP data enhanc.: qty conversion)



It is also possible to upload in Cerise solution historical SE and CO2 data (before 2020) that only exist in former EPS Coach and ETS applications after they have been converted upstream in appropriate format. To do so in the BW transaction we have the option: Data upload from flat file. For information, h istorical data upload is supposed to be done once, and actually has been already performed. Also for manual entries Scope 1 and ETS process emissions cannot be calculated in Cerise solution.

Data have to be entered at following level: ProdEquipt / Vector / Prod/Cons. indicator / Period. If several periods are entered as an interval, input amounts/qties are divided for reporting by the number of corresponding periods; ex. if 1 200 is entered for 01.2020 to 12.2020 (i.e. 12 periods), 100 is saved for each period. There's no need to update qties with a UoM, nor to manage any positive/negative sign . Input data are available in reporting as soon as table entries are saved in ZECO2. **Warning this manual entry only concern AFTER CO2.**



Some data can also be flag for historisation. Like this the data flag for a specific period of time define by the Energy Expert will not be impacted by the futur changes like change of conversion rates because they are old data and at the time it was a different conversion rule in place.

Information

Input data are available in reporting as soon as table entries are saved in ZECO2 via ECO2 - Manual entries before CO2 conv. (Core Query)

Conversion Energy Quantity into CO2 rules:

Conversion process aims at calculating monthly Specific Energy (SE) and CO2 content of both consumption and production Vectors in all ProdEquipts of a Site; purchased, produced or transferred content is distributed all along the ProdEquipts within the Site up to finish/semi-finished products.

At Period / Site / Prod Equipt level, SE/CO2 content is calculated on consumption side; then its transferred on production side for conversion rate calculation; this way, consumption/production content is always balanced (= 0,00)

Conversions steps are performed at each data upload (twice a day at 2Am and 2PM) according to Site calculation sequences, and within a Site according to ProdEquipt calculation sequence, as maintained in ZECO2.

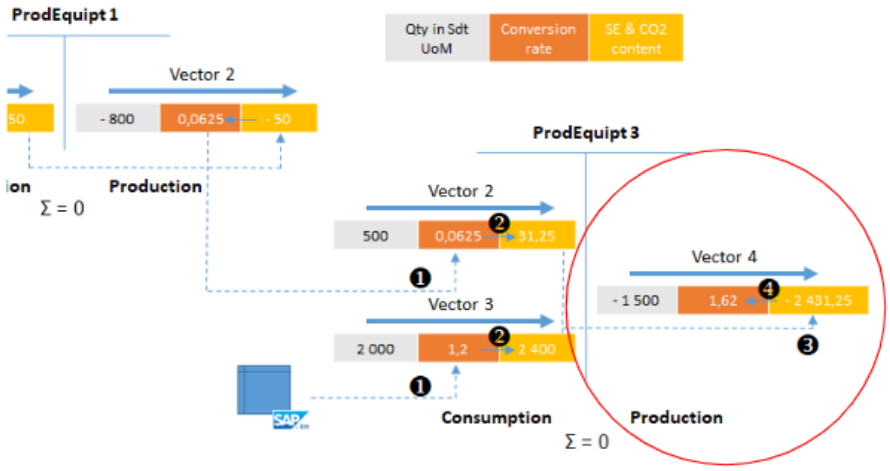
At first, the objective is to get SE/CO2 **conversion rate** of **consumption Vector** either from fixed rates as maintained in ZECO2 conversion table (1), either from production side of preceding ProdEquipts (1) where rates have been already calculated In both cases, **consumption Vector content** is finally calculated this way (2):

- Qty in Sdt UoM (coming from stage 1) * SE/CO2 conversion rate

Then, **SE/CO2 content** of all consumption Vectors is sum up and transferred to related **production Vector** (3)

SE/CO2 conversion rate of production Vector is finally calculated this way (4):

SE/CO2 content / Qty in Sdt UoM (coming from stage 1)



Different kinds of SE/CO2 figures are actually calculated for each consumption/production Vector:

Nature	Rate	Content	Comments
Specific Energy	K_PENRJUF Energy/NRJ (GJ/Std UoM)	K_ENCTNRJ Energy/NRJ (GJ)	
Specific Energy	K_PERAWUF Energy/RM+UT (GJ/Std UoM)	K_ENCTRAW Energy/RM+UT (GJ)	
Specific Energy	-	K_PEQTYF Total Energy content (GJ)	K_ENCTNRJ + K_ENCTRAW
CO2	K_COS1NUF CO2 Scope 1/NRJ (Kg/Std UoM))	K_SC1CTCO CO2 Scope 1/NRJ (Kg)	
CO2	K_COS1PUF CO2 Scope 1/Process (Kg/Sdt UoM)	K_SC1CTPR CO2 Scope 1/Process (Kg)	
CO2	K_COSC2UF CO2 Scope 2 (Kg/Sdt UoM)	K_SC2CONT CO2 Scope 2 (Kg)	
CO2	K_COSC3UF CO2 Scope 3 (Kg/Sdt UoM)	K_SC3CONT CO2 Scope 3 (Kg)	
CO2	-	K_CO2QTF Total CO2 content (Kg)	K_SC1CTCO + K_SC1CTPR + K_SC2CONT + K_SC3CONT

Some additional calculated key figures are available in reports:

Key figure	Comments

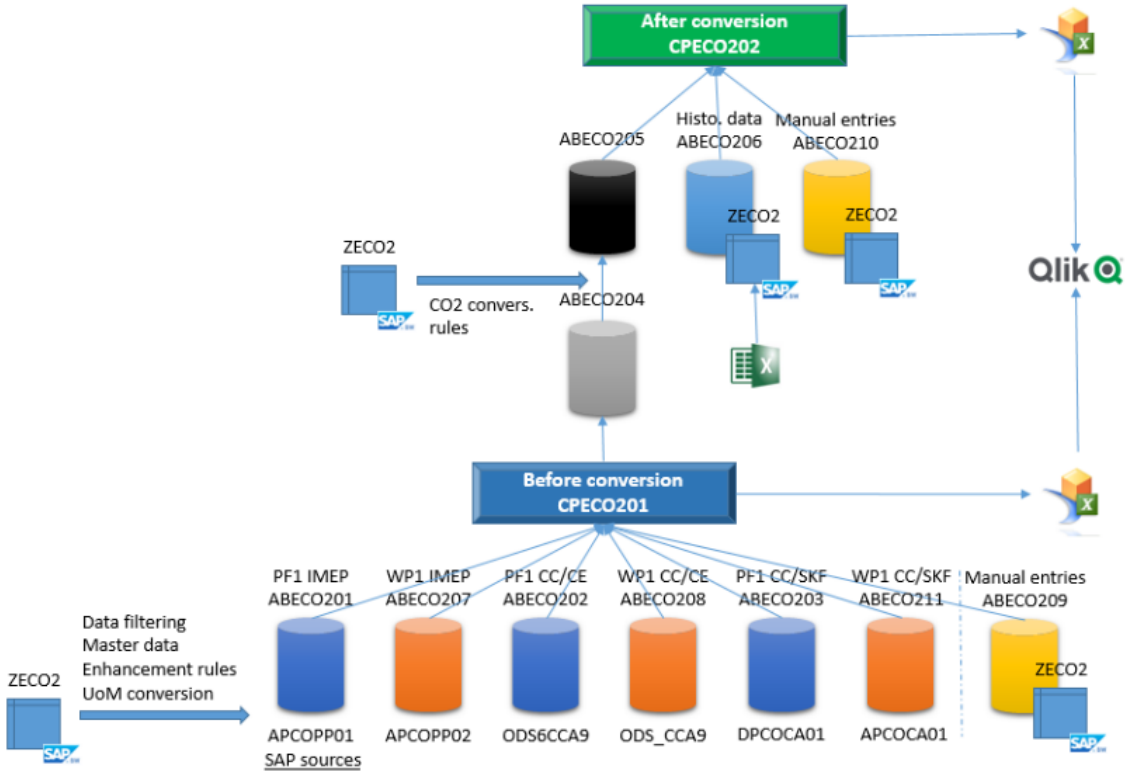
K_SC1EMIS CO2 Emiss. Scope 1 /NRJ (Kg)	Equal to K_SC1CTCO CO2 Scope 1/NRJ (Kg) for consumption entries when both ProdEquipt and Vector are categorized as Scope 1
K_SC1EMPR CO2 Emiss. Scope 1 /Process (Kg)	Manual entry in ZECO2 (see below)
K_SC2EMIS CO2 Emiss. Scope 2 (Kg)	Equal to K_SC2CONT CO2 Scope 2 (Kg) when both ProdEquipt and Vector are categorized as Scope 2
K_SC3EMIS CO2 Emiss. Scope 3 (Kg)	Equal to K_SC3CONT CO2 Scope 3 (Kg) when both ProdEquipt and Vector are categorized as Scope 3
K_ETSEMIS CO2 Emiss. ETS/NRJ (Kg)	If Site is categorized as ETS, equal to K_SC1EMIS CO2 Emiss. Scope 1/NRJ (Kg) * ProdEquipt ETS % * Vector ETS %
K_ETSEMPR CO2 Emiss. ETS /Process (Kg)	Manual entry in ZECO2 (see below)

3.0 Application Feature Overview

Reports	Definition	Prompts	BW Workbook Query	Query Technical Name
ECO2 - Database before CO2 conv. (Core Query)	Collect all data related to Energy from the site. Data related to energy quantity, not converted in CO2 Emission. Data sources are SAP (WP1/PF1) , including IMEP data, Cost center postings and SKF postings. We also have some manual entry for site that are not in SAP. Contains SAP data + Manual entries	Authorization scope Fiscal Year Period Index 1 Plant Site PO2 flag : ECO /SCO	BW_WBK_ECO2_0001	BW_QRY_CPECO201_0001
ECO2 - SAP database after CO2 conv. (Core Query)	Energy data converted into CO2 Emission.	Authorization scope Fiscal Year Period Plant Site PO2 flag : ECO /SCO	BW_WBK_ECO2_0002	BW_QRY_CPECO202_0001
ECO2 - Historical data from external file incl. CO2 conv. (Core Query)	Historical data from external file, energy quantity converted in CO2.		BW_WBK_ECO2_0003	BW_QRY_CPECO202_0002
ECO2 - Manual entries before CO2 conv. (Core Query)	Capture energy data for site that are not in SAP. The expert can input data via the transaction ZECO2. Contains only only manual entries		BW_WBK_ECO2_0004	BW_QRY_CPECO201_0002
ECO2 - DataSource for ABECO204 (Core Query)	Technical datasource from CPECO01 in order to fuel conversion process in CPECO202	No prompt	n.a	BW_QRY_CPECO201_0000
ECO2 - QV interface before CO2 conv. (Core Query)	For QV update with amounts and quantities in origin UoM	Authorization scope Fiscal Year Period Site PO2 flag : ECO /SCO	n.a	QV_BW_QRY_CPECO201_0001

ECO2 - QV interface after CO2 conv. (Core Query)	For QV update with converted quantities in CO2 quantities.	Authorization scope Fiscal Year Period Plant Site PO2 flag : ECO /SCO	n.a	QV_BW_QRY_CPECO202_0001

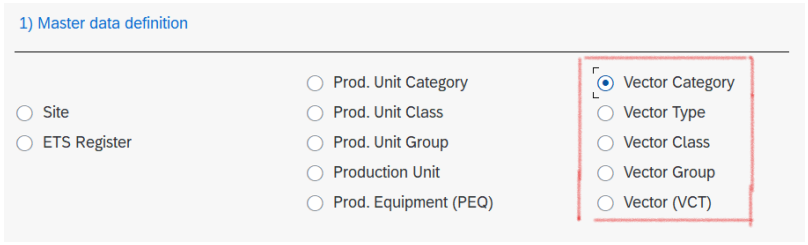
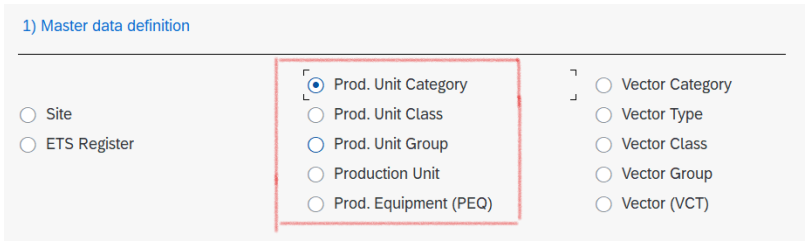
Solution architecture overview :



4.0 Functional Specification

4.1 General Data/Calculations

Dimension	Definition	ZECO2 BW Transaction

Vector	Vector is the element that conveys energy and CO2 content, including: • Energy: natural gas, electricity, steam, coal, coke, liquid fuel.... • Other utilities: water, compressed air… • Intermediate or finished products : H2O2, Soda Ash Light, Silica... • Several raw materials with significant energy or CO2 content: NH3... For reporting purposes, Vectors are grouped in a multi levels hierarchy: **a.** Vector; ex. Natural Gas **b.** Vector Group; ex. Gaseous Non Ren. Fuel **c.** Vector Class; ex. Purchased Fuel **d.** Vector Type; ex. Purchased **e.** Vector Category; ex. External	
Vector EPS Family	EPS Family is a Vector attribute that can be used to facilitate reconciliation with former EPS Coach tool	
Vector Free Grp	Free Grp is an uncontrolled field that can be populated for kind of user grouping (in combination with ProdEquipt Free Grp)	
CO2 ETS % Group [Vector]	CO2 ETS % Group attribute is also allocated to corresponding Vectors; it is used to calculate specific emission key figure (in combination with ProdEquipt CO2 ETS % attribute and Site ETS attribute)	
Scope 1 Scope 2 Scope 3 [Vector]	Scope 1/2/3 Group attributes are allocated to corresponding Vectors; they are used to calculate specific emission key figures (in combination with ProdEquipt Scope 1/2/3 attributes). Scope 1 represents direct energy emission. Scope 2 represents indirect energy emission link to energy production. Scope 3.3 represents energy emission upstream (Ressources before the energy production, for exemple emission emitted by the truck to get uranium for the Power plant that produce electricity)	
Production Equipment	Production Equipment is a subset of a physical production Site; this is the level at which calculated energy and CO2 contents of input and output Vectors are balanced. For reporting purposes, ProdEquipts are grouped in a multi levels hierarchy: **a.** Production Equipment; ex. Steam Boiler **b.** Production Unit; ex. BR-Steam Boiler **c.** Production Unit Group; ex. Steam Boiler **d.** Production Unit Class; ex. Steam **e.** Production Unit Category; ex. Utilities	
Production Unit	A production unit is assigned to one single Site	
GBU PRS Company code	PRS Company code and BFC GBU are needed only for non SAP Sites (otherwise they are automatically derived from SAP master data)	
ETS Register	ETS Register is the lowest level of ETS structure; only ProdUnit belonging to an ETS Site have to be assigned to a Register	
EPS Usage	EPS Usage is a free text that is defined as Production Unit attribute in order to facilitate reconciliation with former EPS Coach tool	
Multi Prod. Vectors	Multi Prod. Vectors flag is an critical attribute in conversion process, used to identify equipments with more than 1 ouput Vector (see above)	

<table>
<tr>
<td>Prod/Cons.</td>
<td>Assigned for all SAP entries to a Production (P) or Consumption (C) indicator in order to differentiate input and output Vectors in a ProdEquipt.</td>
<td>Update rule depending on the source:
<table>
<tr><th>Source</th><th>Update rule</th></tr>
<tr><td>IMEP (WP1/PF1)</td><td>If (Index is equal to 1 or 2) or (If Index is equal to 3 and qty is negative), Prod/Cons. ind. = P

Else Prod/Cons. ind. = C</td></tr>
<tr><td>CC postings (WP1 /PF1)</td><td>If Vector Type = SO (Sold) => Prod/Cons. ind. = P

Elseif Vector Type = PU (Purchased) => Prod/Cons. ind. = C

Elseif If Debit/Credit indicator = S (debit) and qty is positive, Prod/Cons. ind. = C

Elseif Prod/Cons. ind. = P</td></tr>
<tr><td>SKF postings (WP1 /PF1)</td><td>If SKF is assigned to group ECO2-PROD in ECO2-ALL hierarchy, Prod/Cons. ind. = P

Else Prod/Cons. ind. = C</td></tr>
</table>
</td>
</tr>
<tr>
<td>UoM = Unit</td>
<td>The purpose is to convert all origin quantities and corresponding UoMs (Ref. UoMs) in few key UoMs (Std UoM) in order to facilitate subsequente CO2 conversion process.</td>
<td>Conversion table:
<table>
<tr><th>Source UoM</th><th>Dimension</th><th>Ref. UoMs</th><th>Std UoM</th><th>Conv.</th><th>Conversion ex.</th></tr>
<tr><td>BTU British Thermal Unit

GJ Gigajoule

GWH gigawatt hour...</td><td>ENERGY Energy</td><td>KWH Kilowatt hour</td><td>MWH Megawatt hour</td><td>/ 1 000</td><td>5 GJ = (5 * 278 KWH) / 1 000 = 6,95 MWH</td></tr>
<tr><td>KG Kilogram

DTN Quintal

LB US pound...</td><td>MASS Mass</td><td>KG Kilo</td><td>TO Ton</td><td>/ 1 000</td><td>5 LB = (5 * 10 000 / 22 046 KG) / 1 000 = 0,002 TO</td></tr>
<tr><td>BYH British thermal unit/h

KW Kilowatt

W Watt…</td><td>POWER Power</td><td>W Watt</td><td>MGW Megawatt</td><td>/ 1 000 000</td><td>5 KW = (5 * 1 000 W) / 1 000 000 = 0,005 MGW</td></tr>
<tr><td>DA3 cubic decametre

FM Million Cubic Feet

HL hectolitre

KM3 kilometre cube…</td><td>VOLUME Volume</td><td>M3 Cubic metre</td><td>DA3 Cubic decametre</td><td>/ 1 000</td><td>5 KM3 = (5 * 1 000 000 000 M3) / 1 000 = 5 000 000 DA3</td></tr>
<tr><td>KGW Kilogram Active Ingredients

LW US pound Active Ingredients

TW US Ton Active Ingredients...</td><td>ZAI Active ingredients</td><td>KAI Kilogram Active Ingredients</td><td>TOP Active Ingredients Tonne</td><td>/ 1 000</td><td>5 LW = (5 * 10 000 / 22 046 KAI) / 1 000 = 0,002 TOP</td></tr>
<tr><td>1KG kilogram concentrate

1TN metric ton concentrate</td><td>AAAADL (w/o dimension)</td><td></td><td>1TN metric ton concentrate</td><td></td><td>5 1KG = 5 / 1 000 = 0,005 1TN</td></tr>
</table>
Info: Reference UoM of each dimension is maintained in T006D; conversion ratios of each UoM into reference UoM is maintained in T006.
</td>
</tr>
</table>

4.2 Process Detail

4.2.1. Report/Process Definition

Domain	Sustainability
Application	BW CERISE Queries
Provider	CPECO201 - Before CO2 CPECO202 - After CO2
Existing Documentation	Cerise Project presentation

4.2.2. KPI's/Calculations/Indicators

Indicators available in Before CO2 Core Query:

Indicators	Definition	Calculation/Extraction of data
Qty	Quantity in local quantity (base UoM)	
Qty Std UoM	Quantity in Standard Unit of Measure (dimension Std UoM is available to show the unit)	
Qty in AI	Quantity produced (negative) or consumed (positive) in Active ingredient (AI) in base UoM Active ingredient (AI) is when Index_1=1, meaning Finished product	
Qty in AI Std UoM	quantity produced (negative) or consumed (positive) in Active ingredient (AI) in Std UoM.	
Actual Costs	Actual costs of consumption (positive) or production (negative).	
ML Costs	In WP1, the value is the same as Actual Costs. In PF1 value from source Imep : Actual costs produced (negative) or consumed (positive) = ML VC + ML FX + ML DP Field in local currency	For PF1 only: ML Costs = ML VC + ML FX + ML DP
ML Costs EUR	Actual costs produced (negative) or consumed (positive) = ML VC + ML FX + ML DP in Euro	

Indicators available in After CO2 Core Query:

Indicators	Definition	Calculation/Extraction of data
Qty Sdt UoM	Quantity in Standard Unit of Measure (dimension Std UoM is available to show the unit)	
Total Energy content GJ	Total Energy content in Gigajoule	Total Energy content GJ = Energy/NRJ GJ + Energy/RM+UT GJ
Energy/NRJ GJ	Energy content in Gigajoule	
Energy/NRJ GJ /Std UoM		Energy/NRJ GJ/Std UoM = Total Energy content GJ / Qty Sdt UoM
Energy/RM+UT GJ	Energy raw material and utilities	
Energy/RM+UT GJ /Std UoM	Energy raw material and utilities in Standart Unity of Measure.	
Total CO2 content Kg	Total CO2 content in KG	Total CO2 content Kg = CO2 Scope 1/NRJ Kg+CO2 Scope 1/Process Kg+CO2 Scope 2 Kg+CO2 Scope 3.1 Kg+CO2 Scope 3.3 Kg
CO2 Scope 1 /NRJ Kg	CO2 quantity link to direct energy emission in KG	
CO2 Scope 1 /NRJ Kg/Sdt UoM	CO2 quantity link to direct energy emission in Std UoM	
CO2 Scope 1 /Process Kg	CO2 quantity link to process of production in KG	
CO2 Scope 1 /Process Kg/Sdt UoM	CO2 quantity link to process of production in Std UoM	
CO2 Scope 2 Kg	Indirect energy emission of CO2 link to energy production in KG	
CO2 Scope 2 Kg /Sdt UoM	Indirect energy emission of CO2 link to energy production in Std UoM	
CO2 Scope 3.1 Kg	Quantity of CO2 link to Raw materials in KG	

CO2 Scope 3.1 Kg /Sdt UoM	Quantity of CO2 link to Raw materials in Std UoM	
CO2 Scope 3.3 Kg	Quantity of energy emission upstream in KG	
CO2 Scope 3.3 Kg /Sdt UoM	Quantity of energy emission upstream in Std UoM	
CO2 Emiss. Scope 1/NRJ Kg	CO2 emission in Scope 1 NRJ	
CO2 Emiss. Scope 1/Process Kg	CO2 emission in Scope 1 Process	
CO2 Emiss. Scope 2 Kg	CO2 emission in Scope 2	
CO2 Emiss. Scope 3.1 Kg	CO2 Emission of Raw Materials.	
CO2 Emiss. Scope 3.3 Kg	CO2 emission in Scope 3.3	
CO2 Emiss. ETS /NRJ Kg	CO2 Emission Emission Trading System for Scope 1 NRJ	
CO2 Emiss. ETS /Process Kg	CO2 Emission Emission Trading System for Scope 1 Process	

5.0 Non-functional Descriptions

5.1 Usability

as per standards

5.2 Regulatory Compliance

GDPR compliant.

5.3 Security

- *Only authorised Users be able to access data.*
- *PO2 split : Authorization group*

5.4 Performance

as per standards

5.5 Reliability

as per standards

5.6 Scalability

Historical report, no small enhancements will be performed and no new access except for new joiners in HR domain.

5.7 Compatibility

as per standards

5.8 Availability

as per standards

5.9 Refresh of the Data

2 daily refresh : 2pm CET and 2 am CET