

Allocation in phase 3 of EU ETS

Case study: integrated steel mill

2 May 2011

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General information

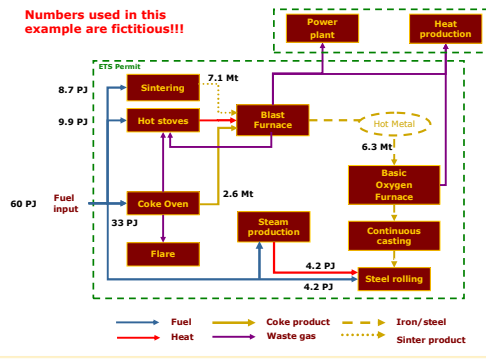
- Is the installation eligible for free allocation? **Yes**
- Is the installation an electricity generator pursuant Art. 3(u)? **No**
- What is the chosen baseline period? **2005-2008**
- Did the installation operate at least one day in each calendar year in the baseline period? **Yes**
- Greenhouse Gas Emissions and Energy input from fuels

Data collection template: tab D_Emissions

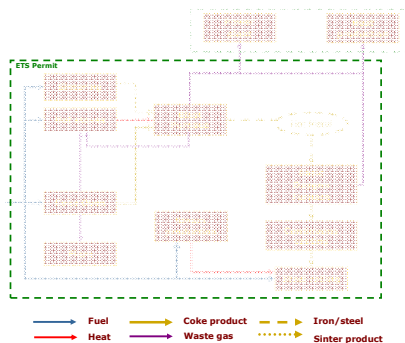
Total Direct Greenhouse Gas Emissions and Energy Input from Fuels						
3 Result of installation level data for use in sheets "D_Emissions" and "E_EnergyFlows":						
Installation level data:	Unit	2005	2006	2007	2008	2009
Total CO2 emissions	t CO2 / year	12,000,000	14,000,000	12,000,000	8,000,000	0
Memo-Item: Biomass emissions	t CO2 / year	0	0	0	0	0
Total N2O emissions	t CO2e/year	0	0	0	0	0
Total PFC emissions	t CO2e/year	0	0	0	0	0
Total direct emission of the installation	t CO2e/year	12,000,000	14,000,000	12,000,000	8,000,000	0
Total energy input from fuels	13.1 year	85,000.00	100,000.00	85,000.00	60,000.00	0

Simplified integrated iron and steel plant

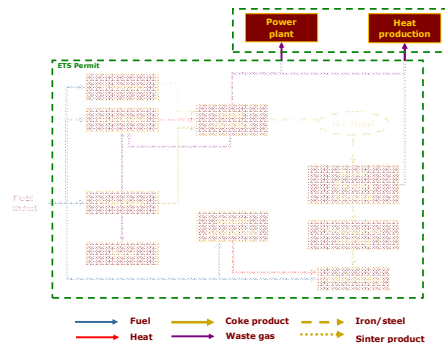
Numbers used in this example are fictitious!!!



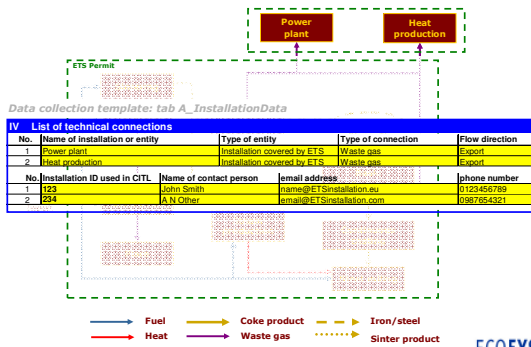
Case Study - Simplified integrated iron and steel plant



Identify relevant technical connections



Identify relevant technical connections



Data collection template: tab A_InstallationData

IV List of technical connections				
No.	Name of installation or entity	Type of entity	Type of connection	Flow direction
1	Power plant	Installation covered by ETS	Waste gas	Export
2	Heat production	Installation covered by ETS	Waste gas	Export

No.	Installation ID used in CTL	Name of contact person	Email address	Phone number
1	123	John Smith	name@ETSInstallation.eu	0123456789
2	234	A.N.Other	email@ETSInstallation.com	0987654321

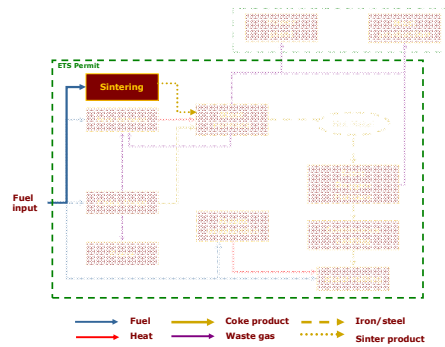
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A SUSTAINABLE ENERGY SUPPLY FOR EVERYONE

ECOFYS

Define sub-installations

A sinter product benchmark sub-installation



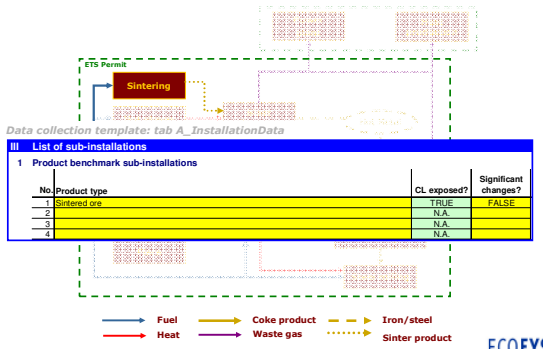
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A SUSTAINABLE ENERGY SUPPLY FOR EVERYONE

ECOFYS

Define sub-installations

A sinter product benchmark sub-installation



Data collection template: tab A_InstallationData

III List of sub-installations				
1 Product benchmark sub-installations				
No.	Product type	CL exposed?	Significant changes?	
1	Sintered ore	TRUE	FALSE	
2	Sintered ore	N.A.	FALSE	
3	Coke	N.A.		
4		N.A.		

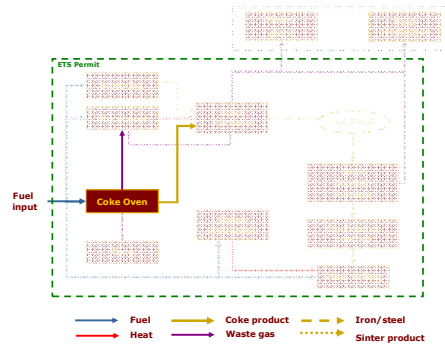
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ECOFYS

Define sub-installations

A coke product benchmark sub-installation



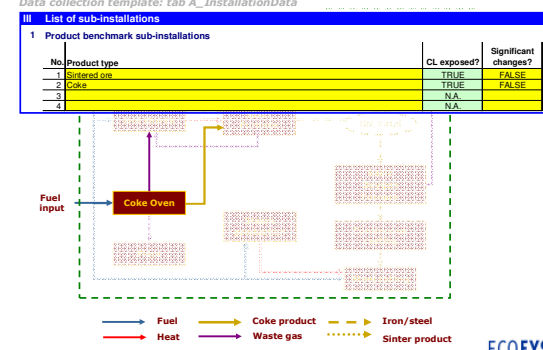
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Define sub-installations

A coke product benchmark sub-installation



Data collection template: tab A_InstallationData

III List of sub-installations				
1 Product benchmark sub-installations				
No.	Product type	CL exposed?	Significant changes?	
1	Sintered ore	TRUE	FALSE	
2	Coke	TRUE	FALSE	
3		N.A.		
4		N.A.		

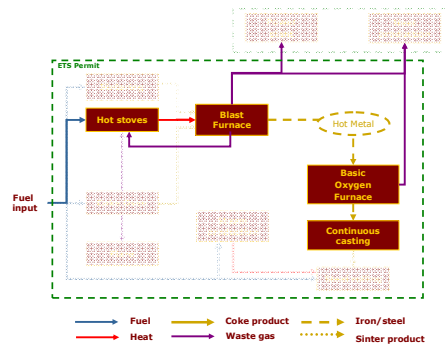
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Define sub-installations

A hot metal benchmark sub-installation



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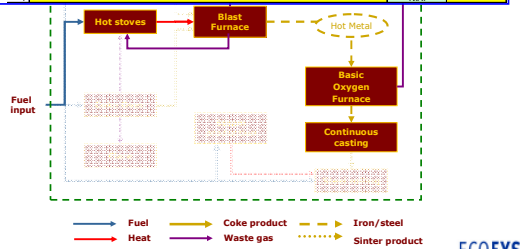
A SUSTAINABLE ENERGY SUPPLY FOR EVERYONE

ECOFYS

Define sub-installations A hot metal benchmark sub-installation

Data collection template: tab A_InstallationData

III List of sub-installations			
1 Product benchmark sub-installations			
No.	Product type	CL exposed?	Significant changes?
1	Sinter gas	TRUE	FALSE
2	Coke	TRUE	FALSE
3	Hot metal	TRUE	FALSE
4		N/A	

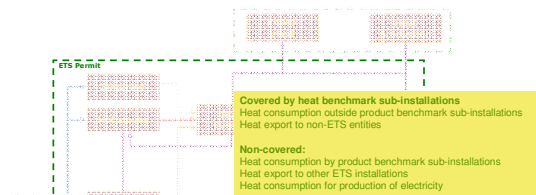


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Define sub-installations A heat benchmark sub-installation - exposed



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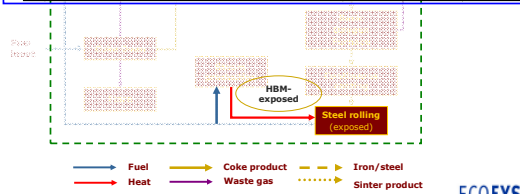
A SUSTAINABLE ENERGY SUPPLY FOR EVERYONE

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Define sub-installations A heat benchmark sub-installation- exposed

Data collection template: tab A_InstallationData

III List of sub-installations				
2 Sub-installations with fall-back approaches				
No.	Sub-installation type	relevant?	CL exposed?	Significant changes?
11	Heat benchmark sub-installation, CL	TRUE	TRUE	FALSE
12	Heat benchmark sub-installation, non-CL	FALSE	FALSE	///

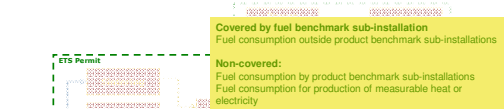


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Define sub-installations A fuel benchmark sub-installation- exposed



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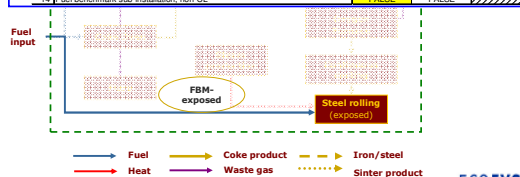
A SUSTAINABLE ENERGY SUPPLY FOR EVERYONE

ECOFYS

Define sub-installations A fuel benchmark sub-installation- exposed

Data collection template: tab A_InstallationData

III List of sub-installations				
2 Sub-installations with fall-back approaches				
No.	Sub-installation type	relevant?	CL exposed?	Significant changes?
11	Heat benchmark sub-installation, CL	TRUE	TRUE	FALSE
12	Heat benchmark sub-installation, non-CL	FALSE	FALSE	///
13	Fuel benchmark sub-installation, CL	TRUE	TRUE	FALSE
14	Fuel benchmark sub-installation, non-CL	FALSE	FALSE	///

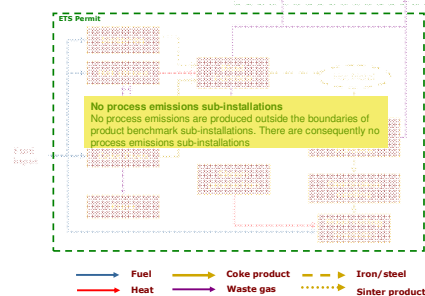


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Define sub-installations Process emissions sub-installation



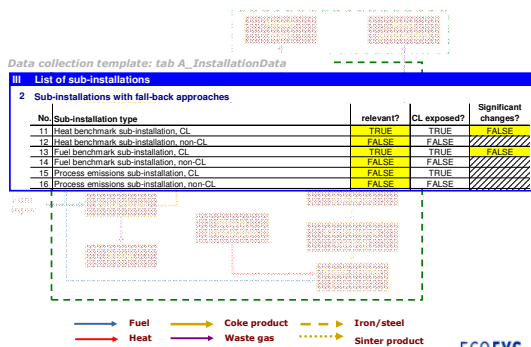
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Define sub-installations

Process emissions sub-installation



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Attribute all (other) emissions, fuel, and measurable heat to sub-installations

- For allocation,
 - Exact data for measurable heat consumption/export is necessary for **heat benchmark sub-installation**
 - Exact data on energy input is necessary for **fuel benchmark sub-installations**
 - Exact emissions is necessary if a **process emissions sub-installation** would be present

Nevertheless, to be able to check completeness and consistency (Art. 7.7), operators will:

- In the data collection template: estimate the attribution of all other emissions, energy input and measurable heat
- In the methodology report: describe the attribution

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Attribute all (other) emissions, fuel, and measurable heat to sub-installations

- For allocation,
 - Exact data for measurable heat consumption/export is only necessary for **heat benchmark sub-installation**

The data collection template contains a 'simple' and a 'complex' tool to determine the balance of measurable heat flows: the table below only shows the outcome of the 'complex' tool:

Data collection template: tab E_EnergyFlows

II Measurable heat					
3 Summary of heat sub-installations					
	Unit	2005	2006	2007	2008
Heat benchmark sub-installation, CL	TJ / year	5,950.00	7,000.00	5,950.00	4,200.00
Heat benchmark sub-installation, non-CL	TJ / year	0.00	0.00	0.00	0.00

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Attribute all (other) emissions, fuel, and measurable heat to sub-installations

- For allocation,
 - Exact data on energy input is only necessary for **fuel benchmark sub-installations**

Data collection template: tab E_EnergyFlows

I Energy input from fuels					
1 Overview and split into use categories					
Usage type of fuel input	Unit	2005	2006	2007	2008
Fuel input to electricity production	TJ / year	0.00	0.00	0.00	0.00
Fuel input for production of measurable heat	TJ / year	5,950.00	7,000.00	5,950.00	4,200.00
Fuel input as part of product benchmarks	TJ / year	73,100.00	86,000.00	73,100.00	51,600.00
Fuel benchmark sub-installation, CL	TJ / year	5,950.00	7,000.00	5,950.00	4,200.00
Fuel benchmark sub-installation, non-CL	TJ / year	0.00	0.00	0.00	0.00
Total	TJ / year	0.00	0.00	0.00	0.00

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Attribute all (other) emissions, fuel, and measurable heat to sub-installations

- For allocation,
 - Exact emissions would only be necessary if a **process emissions sub-installation** would be present

Data collection template: tab D_Emissions

II Attribution of emissions to sub-installations					
2 Attribution to sub-installations					
Installation level data:	Unit	2005	2006	2007	2008
Emissions related to product benchmarks	%	86.00	86.00	86.00	86.00
Emissions related to heat benchmark sub-installations	%	7.00	7.00	7.00	7.00
Emissions related to fuel benchmark sub-installations	%	7.00	7.00	7.00	7.00
Process emissions sub-installation, CL	%	0.00	0.00	0.00	0.00
Process emissions sub-installation, non-CL	%	0.00	0.00	0.00	0.00
Control: Other emissions (non-aliable)	%	0.00	0.00	0.00	0.00

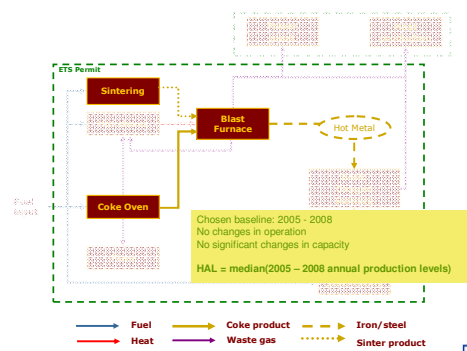
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Determine historical activity levels

Product benchmark sub-installations (all three shown together and highlighting product flows only)

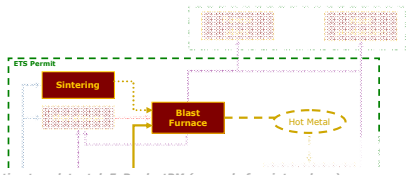


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Determine historical activity levels Product benchmark sub-installation



Data collection template: tab F_ProductBM (example for sintered ore)

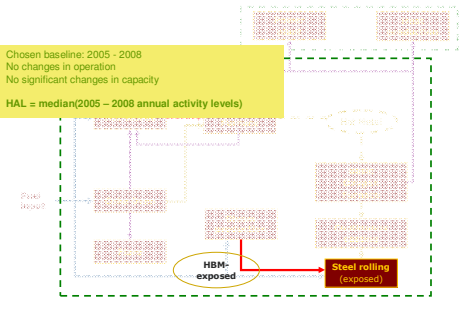
Historic Activity levels and disaggregated production details

Sub-installation with product benchmark 1:

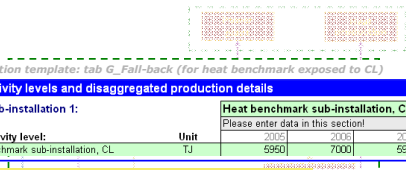
Main activity level:	Unit	2005	2006	2007	2008
i. Sintered ore	tonnes	10 700 000	12 500 000	10 700 000	7 100 000
ii. From sheet "H_SpecialBM"	tonnes				
iii. Values used for calculation	tonnes	10 700 000	12 500 000	10 700 000	7 100 000

So HAL = median (10.7, 12.5, 10.7, 7.1) = 10.7 Mt

Determine historical activity levels Heat benchmark sub-installation - exposed



Determine historical activity levels Heat benchmark sub-installation - exposed



Data collection template: tab G_Fall-back (for heat benchmark exposed to CL)

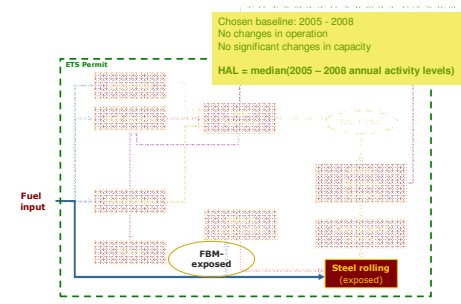
Historic Activity levels and disaggregated production details

Fall-Back Sub-installation 1:

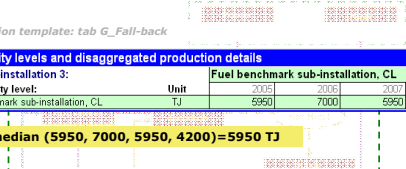
Main activity level:	Unit	2005	2006	2007	2008
Heat benchmark sub-installation, CL	TJ	5950	7000	5950	4200

So HAL = median (5950, 7000, 5950, 4200) = 5950 TJ

Determine historical activity levels Fuel benchmark sub-installation- exposed



Determine historical activity levels Fuel benchmark sub-installation- exposed



Data collection template: tab G_Fall-back

Historic Activity levels and disaggregated production details

Fall-Back Sub-installation 3:

Main activity level:	Unit	2005	2006	2007	2008
Fuel benchmark sub-installation, CL	TJ	5950	7000	5950	4200

So HAL = median (5950, 7000, 5950, 4200) = 5950 TJ

Determine preliminary total allocation Without considering carbon leakage status

Sinter sub-installation:	$BM_{\text{sinter}} [EUA/t \text{ product}] \times HAL_{\text{sinter}} [Mt \text{ product}]$
Coke sub-installation	$BM_{\text{coke}} [EUA/t \text{ product}] \times HAL_{\text{coke}} [Mt \text{ product}]$
Hot Metal sub-installation	$BM_{\text{hot metal}} [EUA/t \text{ product}] \times HAL_{\text{hot metal}} [Mt \text{ product}]$
Heat benchmark sub-installation:	$BM_H [EUA/TJ \text{ heat}] \times HAL_H [TJ \text{ heat}]$
Fuel benchmark sub-installation:	$BM_F [EUA/TJ \text{ fuel}] \times HAL_F [TJ \text{ fuel}]$
Preliminary total allocation: (not considering CL-status)	Sum of the above

- BM: Benchmark
- HAL: Historical activity level
- EUA: Allowances

The allocation without considering CL-status is the same for each year

The allocation without considering CL-status is needed for the Commission to determine the need for a **cross-sectoral correction factor**

Determine preliminary total allocation Without considering carbon leakage status

Sinter sub-installation:	$0.171 \text{ [EUA/t product]} \times 10.7 \text{ [Mt product]}$
Coke sub-installation	$0.286 \text{ [EUA/t product]} \times 3.8 \text{ [Mt product]}$
Hot Metal sub-installation	$1.328 \text{ [EUA/t product]} \times 9.4 \text{ [Mt product]}$
Heat benchmark sub-installation:	$62.3 \text{ [EUA/TJ heat]} \times 5950 \text{ [TJ heat]}$
Fuel benchmark sub-installation:	$56.1 \text{ [EUA/TJ fuel]} \times 5950 \text{ [TJ fuel]}$
Preliminary total allocation: (not considering CL-status)	16.1 million allowances

BM: Benchmark
HAL: Historical activity level
EUA: Allowances

The allocation without considering CL-status is the same for each year

The allocation without considering CL-status is needed for the Commission to determine the need for a **cross-sectoral correction factor**

Determine preliminary total allocation Considering carbon leakage status

Product benchmark sub-installations	$BM_p \text{ [EUA/t product]} \times HAL_p \text{ [t product]} \times CLEF$
Heat benchmark sub-installations:	$BM_H \text{ [EUA/TJ heat]} \times HAL_H \text{ [TJ heat]} \times CLEF$
Fuel benchmark sub-installations:	$BM_f \text{ [EUA/TJ fuel]} \times HAL_f \text{ [TJ fuel]} \times CLEF$
Preliminary total allocation: (considering CL-status)	Sum of the above

BM: Benchmark
HAL: Historical activity level
EUA: Allowances
CLEF: Carbon leakage exposure factor
- For not-exposed sectors (80% in 2013, 30% in 2020)
- For exposed sectors (100% from 2013 to 2020)

The allocation with consideration of CL-status can differ from year to year

The CL-status may change in the future

Determine final total allocation (not in NIMs)

In this case the installation is not an "electricity generator" (pursuant to Art 3(u)); so:

$$\text{Final allocation} = F_{\text{instal,prel.}}(k) \times \text{CSF}(k)$$

$F_{\text{instal,prel.}}(k)$: Preliminary allocation considering CL-status in year k
CSF(k): Cross-sectoral correction factor in year k (if applicable)

In case the installation would have been an "electricity generator", then:

$$\text{Final allocation} = F_{\text{instal,prel.}}(k) - 0.0174 \times F_{\text{instal,prel.}}(\mathbf{2013}) \times (k - \mathbf{2013})$$

$F_{\text{instal,prel.}}(k)$: Preliminary allocation considering CL-status in year k
0.0174: Linear reduction factor