Deliverable Report

Grant Agreement number: 649867

Project acronym: STEAM UP

Project title: Steam and Management Under Pressure

Funding Scheme: Horizon 2020

Date of latest version of Annex I against which the assessment will be made:

Deliverable Number: Deliverable 2.2 **Deliverable Title:** Initial information data sets for Bench Marking

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Description of the Deliverable:

This deliverables consist of data sets collected at enterprises in the partner countries that represent the (energy efficiency) performance of steam boilers. Data are, as far as practically available at the enterprises, collected in an excel data sheet (one for each enterprise).

Summary

The objective of this deliverable is to collect a representative set of data to benchmark the steam efficiency performance of individual enterprises with their peers. It is the objective to bench mark the enterprises on 2 or 3 parameters that represent the steam performance of the enterprises, under the condition that sufficient representative data can practically be made available. Primary focus was on the following parameters:

- Efficiency of the steam boiler [%]
- Steam production efficiency (caloric value of steam generated/caloric value of fuel) [GJ/GJ]
- Overall steam use efficiency [kg steam produced/product (piece, kg, m²)]

A total of **54** initial data sets were collected. The efficiency of the steam boiler could be obtained in almost 94 % of the cases however the other two parameters are less often available, respectively in 25 (46%) and 26 (48%) of the assessed enterprises. Apart from the above mentioned parameters a set of **14** additional parameters was inventoried. This in order to get a complete as possible picture of steam boiler operation and performance in Europe. This information will in the course of the project be used to do (trend) analysis on steam boiler operation and performance.

General							
information				Information Steam S	ystem		
Country	SPAIN			Installed Capacity	-	1000	[MWth]
Company number	1			System	Open	Х	Closed
Sector	Food Industry						
Primary Bench Mar	k Data (prioritized by St	eam Up pa	irtners)				
Efficiency of steam l	poiler	85	[%]				
Steam production e	fficiency	4,2	[GJ/Ton produced ste	am]			
- Alternativ when at	oove not available		[m ³ gas/m3 feed in w	ater] at [temperature o	f feed in water]		10,3 [°C]
- Alternativ when ab	oove not available		[m ³ gas/kg fresh wate	er for steam]			
Overall steam use e	fficiency		[kg steam/ per produ	ct (piece, kg, m2)]			
			[kWh fuel for steam b				
- Alternativ when at	ove not available	0,8	product	-			
Additional Banch M	l ark Data (collect when	available)					
Kind of fuel	iaik Data (collect when		[and oil biomore]				
Nominal steam capa	acity	gas 1000	[gas, oil, biomass] [tons/hour]				
Size of boiler	icity						
Boiler Pressure		1000	[MWth]				
level		8	[barg] (pressure refer	red to atmosphere (1 b	ar absolute)		
Boiler operation			[hours/year]				
Kind of control		2200	$[CO/O_2]$				
Exhaust Gas Temper	rature	205	[°C] after economizer	s ecc	onomizer	yes	no X
O ₂ level in exhaust g			[%]			,	
Rate of condensate		0		at [temperature of co	ndensate return	1	[°C]
Rate of direct used s		100				1	
Leakage detection s		100	no X		frequency		[times/year]
	yes	L			nequency		[נווופא אכמו]

General						
information			Int	formation Steam System		
				stalled		
Country	SPAIN		Ca	pacity		1,1 [MWth]
Company number	2		Sy	stem	Open	Closed X
	Food					
Sector	industry					
Primary Bench Mar	k Data (prioritized	by Steam Up partners)				
Efficiency of steam b	ooiler	82 [%]				
Steam production et		2,5 MJ/k	g steam			
- Alternativ when ab	•		-	er] at [temperature of fee	d in water]	10,3 [°C]
- Alternativ when ab	ove not available		as/kg fresh water f		-	
			eam/ per product			
Overall steam use ef	fficiency	m2)]				
- Alternativ when ab	ove not available	0,45 kWh	fuel/ kg final produ	ıct		
Additional Bench M	ark Data (collect w	hen av <u>ailable)</u>				
Kind of fuel		diesel oil [gas,	oil, biomass]			
Nominal steam capa	acity	1500 [tons	/hour]			
Size of boiler		1,1 [MW	:h]			
Boiler Pressure						
level				d to atmosphere(1 bar at	osolute)	
Boiler operation		8000 [hour	s/year]			
Kind of control		[CO/0	D ₂]			
Exhaust Gas Temper	rature	200 [°C] a	fter economizers	economizer		yes no X
O ₂ level in exhaust g	as in	[%]				
Rate of condensate	return	70 [%]	at	[temperature of condensa	ate return]	96 [°C]
Rate of direct used s	steam	0 [%]		- ,	-	
Leakage detection st	team traps	yes	no X	freq	quency	[times/year]
		•				

General										
information				Information Steam System						
				Installed						
Country	Spain			Capacity	_	2,5	[MWth]			
Company number	3			System	Open		Closed X			
Sector	Chemical									
Primary Bench Marl	k Data (prioritized by St	team Up pa	rtners)							
Efficiency of steam b	ooiler	87	[%]							
, Steam production ef		2,5								
- Alternativ when ab	•	,-		water] at [tempe	rature of feed in wate	erl	10,4 [°C]			
- Alternativ when ab			[m ³ gas/kg fresh wat	-			[0]			
			[kg steam/ per prod	-						
Overall steam use ef	ficiency		m2)]							
- Alternativ when ab	ove not available	0.02	[kWh fuel /piece]							
		- / -	, ,							
Additional Bench M	ark Data (collect when	available)								
Kind of fuel		gas	[gas, oil, biomass]							
Nominal steam capa	city	2	[tons/hour]							
Size of boiler		2,5	[MWth]							
Boiler Pressure										
level		7	[barg] (pressure refe	erred to atmosph	ere (1 bar absolute)					
Boiler operation		2500	[hours/year]							
Kind of control			[CO/O ₂]							
Exhaust Gas Temper	ature	210	[°C] after economize	ers	economizer	yes		no X		
O ₂ level in exhaust g	as in		[%]			-				
Rate of condensate	return	80	[%]	at [temperature	e of condensate retur	nl	92 [°C]			
Rate of direct used s	team	0	[%]				<u> </u>			
Leakage detection st	team traps yes		no]	frequency		1 [time	es/vear]		
	. ,			J						

General										
information					Informatio	n Steam Systen	n			
					Installed					
Country	SPAIN				Capacity			8,1 [MWth]		_
Company number	4				System		Open	Close	ed X	
_		ustry - Meat								
Sector	processir	ng								
Primary Bench Mark	Data (prioritized by	Steam I In n	artners)							
Efficiency of steam b		85	-							
,					-1					
Steam production ef	•	3,8	[GJ/T prod		-					
- Alternativ when ab						mperature of fo	eed in water]	9	,3 [°C]	
- Alternativ when ab					er for steam]				
Overall steam use ef	ficiency	0,38	kWh fuel/	kg final pro	oduct					
- Alternativ when ab	ove not available		[m ³ gas for	steam boi	ler / per pro	oduct(piece, kg,	, m²)]			
Additional Bench Ma	ark Data (collect whe	'n								
available)										
Kind of fuel		gas	[gas, oil, bi	omass]						
Nominal steam capa	city	9,4	[tons/hour	.]						
Size of boiler		8,1	[MWth]							
Boiler Pressure										
level					red to atmo	osphere (1 bar	absolute)			
Boiler operation		7000	[hours/yea	ır]						
Kind of control		02	[CO/O ₂]							
Exhaust Gas Temper	ature	212	[°C] after e	conomizer	S	economize	er	yes	nc	X
O ₂ level in exhaust ga	as in		[%]							
Rate of condensate r	eturn	82	[%]		at [tempera	ature of conder	sate returnl	G	98 [°C]	
Rate of direct used s	team	15	[%]			-		L		
Leakage detection st	eam traps yes		no			fr	equency		2 [times/ye	ear]
	7	L	Ľ				. ,	L		-

information		Information Steam System	
Country	SPAIN	Installed Capacity 0,5 [MWth]	
Company number	5	System Open X Closed	
Sector	Food industry		
Primary Bench Mark D	ata (prioritized by Steam Up p	partners)	
Efficiency of steam boil	er 8	2 [%]	
Steam production effici	iency 2,	1 GJ/T produced steam	
- Alternativ when above	e not available	[m ³ gas/m3 feed in water] at [temperature of feed in water] 9,3 [°C]	
- Alternativ when above	e not available	[m ³ gas/kg fresh water for steam]	
Overall steam use effici	iency 0,3	5 kWh fuel/ kg final product	
	,	[kWh fuel for steam boiler / kg final	
- Alternativ when above	e not available 0,14	4 product	
	Data (collect when available		
Kind of fuel	diesel oi		
Nominal steam capacity	- ,		
Size of boiler	0,	5 [MWth]	
Boiler Pressure			
level		8 [barg] (pressure referred to atmosphere (1 bar absolute)	
Boiler operation	220	0 [hours/year]	
Kind of control		[CO/O ₂]	
Exhaust Gas Temperatu	ure 20	8 [°C] after economizers economizer yes no X	
O ₂ level in exhaust gas	in	[%]	
Rate of condensate ret	urn	[%] at [temperature of condensate return] [°C]	
Rate of direct used stea	am 10		
Leakage detection stea	m traps yes X	no X frequency [times/year]	
	,		

General										
information				Information Steam System						
				Installed						
Country	SPAIN			(Capacity			1,2 [MWth]		
Company number	6			5	System	Оре	en X	Closed	Х	
Sector	Beverage	industry								
Primary Bench Mark	Data (prioritized by S	Steam Up p	artners)							
Efficiency of steam bo	oiler	86	[%]							
Steam production eff	iciency	1,32	[GJ/T prod	uced steam]					
- Alternativ when abo	ve not available		[m ³ gas/m	B feed in wa	iter] at [tempera	ture of feed in	water]	9,3	[°C]	
- Alternativ when abo	ve not available		[m³ gas/kg	fresh wate	r for steam]				-	
Overall steam use eff	iciency	0,11	kWh fuel/	L final produ	uct					
- Alternativ when abo	-				er / per product()	piece, kg, m ²)]				
			In Basie	Steam Son		51666) ((8) (11 /)				
Additional Bench Ma	rk Data (collect whe	n								
available)	·									
Kind of fuel		gas	[gas, oil, bi	omass]						
Nominal steam capac	ity	1,3	[tons/hour]						
Size of boiler		1,2	[MWth]							
Boiler Pressure										
level		6	[barg] (pre	ssure referr	ed to atmospher	e (1 bar absolu	ite)			
Boiler operation		1000	[hours/yea	r]						
Kind of control			[CO/O ₂]							
Exhaust Gas Tempera	ture	194	[°C] after e	conomizers	e	conomizer		yes] r	no X
O ₂ level in exhaust ga	s in		[%]						-	
Rate of condensate re	eturn	65	[%]	ā	at [temperature c	of condensate r	eturn]	95	[°C]	
Rate of direct used st	eam		[%]		- ,				<u> </u>	
Leakage detection ste	eam traps yes	Х	no			frequen	су	0,5	[times/	'year]
							-	<u> </u>	_ - <i>'</i>	

General								
information				Information Ste	am System			
				Installed				
Country	SPAIN			Capacity	_	10 [M	Wth]	٦
Company number	7			System	Open		Closed X	
Sector	Chemical	industry						
Primary Bench Mark	Data (prioritized by C	toom Un no	rtnors)					
-		· · ·						
Efficiency of steam bo			[%]					
Steam production eff	•	10,9	[GJ/T produced stea	-				
- Alternativ when abo	ve not available		-	-	rature of feed in wat	er]	10,3 [°C]	
- Alternativ when abo	ove not available		[m ³ gas/kg fresh wat	er for steam]				
			[kg steam/ per prod	uct (piece, kg,				
Overall steam use eff	iciency	0,53	m2)]					
- Alternativ when abo	ve not available		[m ³ gas for steam bo	oiler / per produc	t(piece, kg, m²)]			
Additional Bench Ma	rk Data (collect when	available)						
Kind of fuel		gas	[gas, oil, biomass]					
Nominal steam capac	ity	13,3	[tons/hour]					
Size of boiler		10	[MWth]					
Boiler Pressure								
level		8	[barg] (pressure refe	rred to atmosph	ere (1 bar absolute)			
Boiler operation		8500	[hours/year]					
Kind of control			$[CO/O_2]$					
Exhaust Gas Tempera	ture	216	[°C] after economize	rs	economizer	yes	no	х
O ₂ level in exhaust ga	s in		[%]			•		
Rate of condensate re	eturn	87	[%]	at [temperature	e of condensate retur	nl	95 [°C]	
Rate of direct used st		0	[%]					
Leakage detection ste			no]	frequency		1 [times/yea	arl
	yes	~		J	inequency			o.1

General										
information				Information Steam System						
				Installed						
Country	SPAIN			Capacity		10,9 [MWth]				
Company number	8			System	Open X	X Closed X				
Sector	Food indu	istry								
Primary Bench Mark	Data (prioritized by s	Steam Up n	artners)							
Efficiency of steam bo			[%]							
				aml						
Steam production eff	•	0,75	[GJ/kg produced ste	-						
- Alternativ when abo			_	-	ature of feed in wate	er]11 [°C]				
- Alternativ when abo			[m ³ gas/kg fresh wa							
Overall steam use eff	iciency	0,4	[kWh fuel/ kg final	product]						
- Alternativ when abo	ove not available		[m ³ gas for steam b	oiler / per product(piece, kg, m ²)]					
Additional Bench Ma	rk Data (collect whe	า								
available)										
Kind of fuel		gas	[gas, oil, biomass]							
Nominal steam capac	city	13,5	[tons/hour]							
Size of boiler		10,9	[MWth]							
Boiler Pressure										
level		8	[barg] (pressure ref	erred to atmosphe	re (1 bar absolute)					
Boiler operation		2750	[hours/year]							
Kind of control		02	[CO/O ₂]							
Exhaust Gas Tempera	ature	212	[°C] after economiz	ers e	conomizer	yes X no				
O₂ level in exhaust ga						,				
Rate of condensate re			[%]		- f i - i i i i i i i i i i i i i i i i - i					
Rate of direct used st		80	[%]	at [temperature	of condensate return	n]94 [°C]				
			[%]	7	c					
Leakage detection ste	eam traps yes	Х	no		frequency	1 [times/year]				

information Information Steam System Country SPAIN Installed Installed Company number 9 System Open X Closed X Sector Food industry System Open X Closed X Primary Bench Mark Data (prioritized by Steam Up partners) Efficiency 2,13 [Gi/ton produced steam] - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [*C] - Alternativ when above not available [m³ gas/kg fresh water for steam] Overall steam use efficiency 0,14 kWh fuel/ kg final product - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] Additional Bench Mark Data (collect when available) [m³ gas for steam boiler / per product(piece, kg, m²)] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure [soil] (pressure referred to atmosphere (1 bar absolute)	General									
Country SPAIN Capacity 1.6 [MWth] Company number 9 System Open X Closed X Sector Food industry 0 System Open X Closed X Primary Bench Mark Data (prioritized by Steam Up partners) Efficiency of steam boiler 88 % Steam production efficiency 2,13 [Gi/ton produced steam] - - Alternativ when above not available [m³ gas/kg fresh water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 0.3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] - Additional Bench Mark Data (collect when available) Kind of fuel LPG [gas, oil, biomass] - - - - Nominal steam capacity 1,6 [MWth] - - - - - Boiler Operation 8500 [hours/year] - - - - - - - - - - - - - - -	information				Informa	tion Steam System				
Company number 9 System Open X Closed X Sector Food industry System Open X Closed X Primary Bench Mark Data (prioritized by Steam Up partners) Efficiency of steam boiler 88 [%] Steam production efficiency 2,13 [Gl/ton produced steam] Im³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] Im³ gas for steam boiler / per product(piece, kg, m²)] [°C] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] [m³ gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] [MWth] Size of boiler 1.6 [MWth] [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] [cO/O_2] [cO/O_2]					Installed					
Sector Food industry Primary Bench Mark Data (prioritized by Steam Up partners) Efficiency of steam boiler 88 Steam production efficiency 2,13 - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] - Alternativ when above not available [m³ gas/kg fresh water for steam] Overall steam use efficiency 0,14 - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O_2]	Country	SPAIN			Capacity	,		1,6	[MWth]	
Primary Bench Mark Data (prioritized by Steam Up partners) Efficiency of steam boiler 88 Steam production efficiency 2,13 - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 - Alternativ when above not available [m³ gas/kg fresh water for steam] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 10,3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] 10,3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] 10,3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] 10,3 [°C] Additional Bench Mark Data (collect when available) [m³ gas for steam boiler / per product(piece, kg, m²)] 10,3 [°C] Kind of fuel LPG [gas, oil, biomass] 10,6 [MWth] 1,6 Boiler Pressure 1,6 [MWth] 1,6 [MWth] 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6 1,6	Company number	9		System		Open X		Closed X		
Efficiency of steam boiler 88 [%] Steam production efficiency 2,13 [GJ/ton produced steam] - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 0verall steam use efficiency 0,14 kWh fuel/ kg final product - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] [°C] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] [m³ gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] [sze of boiler 1,6 Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation Boiler operation 8500 [hours/year] [cO/O_2]	Sector	Food indu	istry							
Efficiency of steam boiler 88 [%] Steam production efficiency 2,13 [GJ/ton produced steam] - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 0verall steam use efficiency 0,14 kWh fuel/ kg final product - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] [°C] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] [m³ gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] [sze of boiler 1,6 Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation Boiler operation 8500 [hours/year] [cO/O_2]										
Efficiency of steam boiler 88 [%] Steam production efficiency 2,13 [GJ/ton produced steam] - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 0verall steam use efficiency 0,14 kWh fuel/ kg final product - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] [°C] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] [m³ gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] [sze of boiler 1,6 Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation Boiler operation 8500 [hours/year] [cO/O_2]				·						
Steam production efficiency 2,13 [GJ/ton produced steam] - Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 10,3 [°C] Overall steam use efficiency 0,14 kWh fuel/ kg final product 10,3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] 10,3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] 10,3 [°C] - Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] 10,3 [°C] Kind of fuel LPG [gas, oil, biomass] 10,3 [°C] Nominal steam capacity 2,13 [tons/hour] [tons/hour] [tons/hour] [tons/hour] [tons/hour] [tons/pear] [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] [CO/O ₂] [CO/O ₂] <td>-</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	-			1						
- Alternativ when above not available [m³ gas/m3 feed in water] at [temperature of feed in water] 10,3 [°C] - Alternativ when above not available [m³ gas/kg fresh water for steam] 0.3 [°C] Overall steam use efficiency 0,14 kWh fuel/ kg final product 10,3 [°C] - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] [m³ gas for steam boiler / per product(piece, kg, m²)] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] [m³ gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] [tons/hour] Size of boiler 1,6 [MWth] [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] [cO/O ₂]	Efficiency of steam be	oiler	88	[%]						
- Alternativ when above not available [m³ gas/kg fresh water for steam] Overall steam use efficiency 0,14 - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] Kind of fuel LPG [gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O ₂]	Steam production eff	iciency	2,13	[GJ/ton produce	d steam]			F		
Overall steam use efficiency 0,14 kWh fuel/ kg final product - Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] Additional Bench Mark Data (collect when available) [m³ gas, oil, biomass] Kind of fuel [PG [gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O2] [CO/O2]	- Alternativ when abo	ove not available		[m ³ gas/m3 feed	l in water] at	[temperature of fe	ed in water]		10,3 [°C]	
 Alternativ when above not available [m³ gas for steam boiler / per product(piece, kg, m²)] Additional Bench Mark Data (collect when available) Kind of fuel LPG [gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure [evel 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O₂] 	- Alternativ when abo	ove not available		[m ³ gas/kg fresh	water for ste	am]				
Additional Bench Mark Data (collect when available) Kind of fuel LPG [gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O2]	Overall steam use eff	iciency	0,14	kWh fuel/ kg fina	al product					
Additional Bench Mark Data (collect when available) Kind of fuel LPG [gas, oil, biomass] Nominal steam capacity 2,13 [tons/hour] Size of boiler 1,6 [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O2]	- Alternativ when abo	ove not available		[m ³ gas for stear	n boiler / per	product(piece, kg.	m²)]			
Kind of fuelLPG[gas, oil, biomass]Nominal steam capacity2,13[tons/hour]Size of boiler1,6[MWth]Boiler Pressure8[barg] (pressure referred to atmosphere (1 bar absolute)Boiler operation8500[hours/year]Kind of control[CO/O2]						p (p , 8)	/]			
Kind of fuelLPG[gas, oil, biomass]Nominal steam capacity2,13[tons/hour]Size of boiler1,6[MWth]Boiler Pressure8[barg] (pressure referred to atmosphere (1 bar absolute)Boiler operation8500[hours/year]Kind of control[CO/O2]										
Kind of fuelLPG[gas, oil, biomass]Nominal steam capacity2,13[tons/hour]Size of boiler1,6[MWth]Boiler Pressure8[barg] (pressure referred to atmosphere (1 bar absolute)Boiler operation8500[hours/year]Kind of control[CO/O2]	Additional Bench Ma	rk Data (collect when	available)							
Nominal steam capacity2,13[tons/hour]Size of boiler1,6[MWth]Boiler Pressure8[barg] (pressure referred to atmosphere (1 bar absolute)Boiler operation8500[hours/year]Kind of control[CO/O2]	Kind of fuel		LPG	[gas, oil, biomas	s]					
Size of boiler 1,6 [MWth] Boiler Pressure 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O2]	Nominal steam capad	ity	2,13		-					
level 8 [barg] (pressure referred to atmosphere (1 bar absolute) Boiler operation 8500 [hours/year] Kind of control [CO/O2]	Size of boiler		1,6	[MWth]						
Boiler operation 8500 [hours/year] Kind of control [CO/O2]	Boiler Pressure									
Kind of control [CO/O ₂]	level		8	[barg] (pressure	referred to at	mosphere (1 bar a	ibsolute)			
	Boiler operation		8500	[hours/year]						
	Kind of control			[CO/O ₂]						
	Exhaust Gas Tempera	nture	203		mizers	economize	r	yes	Х	no
O ₂ level in exhaust gas in [%]	O ₂ level in exhaust ga	is in						• [L
Rate of condensate return 68 [%] at [temperature of condensate return] 88 [°C]	Rate of condensate r	eturn	68		at [temp	erature of conden	sate return]	Γ	88 [°C]	
Rate of direct used steam 30 [%]					[comp			L		
Leakage detection steam traps yes X no frequency 5 [times/year]	Leakage detection ste	eam traps ves				fre	auencv	Γ	5 [time	es/vearl
	, , , , , , , , , , , , , , , , , , ,	, yes			I		490109	L		

General							
information				Information Stea	m System		
				Installed			
Country	SPAIN			Capacity		4 [MWth]	
Company number	10			System	Open X	Closed X	
Sector	Beverage	industry					
	- . / /						
Primary Bench Mark							
Efficiency of steam b			[%]				
Steam production eff	ficiency	2,6	[GJ/kg produced ste	am]		I	
- Alternativ when abo	ove not available		[m ³ gas/m3 feed in v	vater] at [tempera	ture of feed in water]	9,3 [°C]	
- Alternativ when abo	ove not available		[m ³ gas/kg fresh wat	er for steam]			
			[kg steam/ per prod	uct (piece, kg,			
Overall steam use eff	ficiency		m2)]				
			[m ³ gas for steam bo	oiler / ton			
- Alternativ when abo	ove not available	12,11	product]				
Additional Bench Ma	ark Data (collect whe	n available)					
Kind of fuel		gas	[gas, oil, biomass]				
Nominal steam capao	city		[tons/hour]				
Size of boiler		4	[MWth]				
Boiler Pressure							
level			[barg] (pressure refe	erred to atmospher	e (1 bar absolute)		
Boiler operation		2000	[hours/year]				
Kind of control		02	[CO/O ₂]				
Exhaust Gas Tempera	ature	220	[°C] after economize	rs e	conomizer	yes	no X
O ₂ level in exhaust ga	as in		[%]				
Rate of condensate r	eturn	30	[%]	at [temperature of	of condensate return]	98 [°C]	
Rate of direct used st	team		[%]				
Leakage detection st			no		frequency	1 [times,	/vearl
	ycs			J	inequency	intes	Yearl

General			
information			Information Steam System
			Installed
Country	Austria		Capacity 3,25 [MWth]
Company number	1		System Open Open Closed
Sector	Laundry		
Primary Bench Mar	k Data (prioritized by S	iteam Un nart	tners)
Efficiency of steam k			
Steam production ef		57	[GJ/GJ]
- Alternativ when ab			[m ³ gas/m3 feed in water] at [temperature of feed in water] [°C]
- Alternativ when ab			[m ³ gas/kg fresh water for steam]
			[kg steam/ per product (piece, kg,
Overall steam use ef	fficiency		[m2)]
- Alternativ when ab	ove not available		[m³ gas for steam boiler / per product(piece, kg, m²)]
Additional Bench M	ark Data (collect wher	n available)	
Kind of fuel		Gas	[gas, oil, biomass]
Nominal steam capa	acity	5	[tons/hour]
Size of boiler		3,25	[MWth]
Boiler Pressure			
level			[barg] (pressure referred to atmosphere (1 bar absolute)
Boiler operation		4500	[hours/year]
Kind of control		modulated	[CO/O ₂]
Exhaust Gas Temper	rature	100	[°C] after economizers economizer yes yes no
O_2 level in exhaust g	as in	2,40	[%]
Rate of condensate	return		
Rate of direct used s	steam	30	[%]
Leakage detection st	team traps yes	s yes	no frequency 1 [times/year]
		L	

General						
information			I	nformation Steam System		
				nstalled		
Country	Austria		(Capacity		6,2 [MWth]
Company number	5		S	System Op	oen Open	Closed
Sector	Dairy					
Primary Bonch Mar	k Data (prioritized by S [.]	toom Un port	nors)			
Efficiency of steam b		97				
		97				
Steam production en	•		[GJ/GJ]		1	[90]
- Alternativ when ab			-	ter] at [temperature of feed in	n water]	[°C]
- Alternativ when ab	ove not available		[m ³ gas/kg fresh water			
Overall steam use of	ficiency		[kg steam/ per produc	t (piece, kg,		
Overall steam use et			m2)]	2		
- Alternativ when ab	ove not available		[m ³ gas for steam boile	er / per product(piece, kg, m ²)]		
	ark Data (collect when					
Kind of fuel		Gas	[gas, oil, biomass]			
Nominal steam capa	icity	10	[tons/hour]			
Size of boiler		6,2	[MWth]			
Boiler Pressure						
level		10	[barg] (pressure referr	ed to atmosphere(1 bar absol	ute)	
Boiler operation		8600	[hours/year]			
Kind of control		Modulated	[CO/O ₂]			
Exhaust Gas Temper	rature	130	[°C] after economizers	economizer		yes yes no
O ₂ level in exhaust g	as in	4,4	[%]			
Rate of condensate	return	80		It [temperature of condensate	return]	[°C]
Rate of direct used s	steam	20	[%]	- •	-	
Leakage detection s	team traps yes		no	frequer	าсง	[times/year]
_	, yes	L			- 1	[

General							
information				Information Steam	System		_
				Installed			
Country	Austria			Capacity		-	[MWth]
Company number	11			System	Open	Х	Closed
Sector	Laundry						
Primary Bench Mar	k Data (prioritized by Si	team Up part	ners)				
Efficiency of steam b		93,5					
Steam production e		/ -	[GJ/GJ]				
- Alternativ when ab	•		[m ³ gas/m3 feed in wa	ater] at [temperat	ure of feed in wa	terl	[°C]
- Alternativ when ab			[m ³ gas/kg fresh wate]	
			[kg steam/ per produc	-			
Overall steam use ef	fficiency		m2)]				
- Alternativ when ab	ove not available		[m ³ gas for steam boil	er / per product(pi	ece, kg, m ²)]		
Additional Bench M	ark Data (collect when	available)					
Kind of fuel	·	Gas	[gas, oil, biomass]				
Nominal steam capa	acity		[tons/hour]				
Size of boiler		3,927	[MWth]				
Boiler Pressure		,					
level		14,5	[barg] (pressure refer	red to atmosphere	(1 bar absolute)		
Boiler operation		4500	[hours/year]				
Kind of control		Modulated	[CO/O ₂]				
Exhaust Gas Temper	rature		[°C] after economizers	s eco	onomizer	yes	Yes no
O ₂ level in exhaust g	as in	5,2	[%]				
Rate of condensate	return			at [temperature of	condensate retu	rn]	[°C]
Rate of direct used s	steam		[%]	- •		-	
Leakage detection st	team traps ves	yes	no		frequency		1 [times/year]
	, = =				, ,		, , , , ,

General						
information				Information Steam System		_
				Installed		
Country	Austria			Capacity	3,935	[MWth]
Company number	12			System Ope	n X	Closed
Sector	Laundry					
Primary Bench Mar	k Data (prioritized by S	Steam Up partne	ers)			
Efficiency of steam l	ooiler	86,8	[%]			
Steam production e	fficiency		[GJ/GJ]			
- Alternativ when ab	ove not available		[m ³ gas/m3 feed in wa	ater] at [temperature of feed in w	ater]	[°C]
- Alternativ when ab	ove not available		[m ³ gas/kg fresh wate	r for steam]		
Overall steam use e	fficiency		[kg steam/ per produc	ct (piece, kg, m2)]		
- Alternativ when at	ove not available		[m ³ gas for steam boil	er / per product(piece, kg, m ²)]		
Additional Bench M	ark Data (collect when	n available)	_			
Kind of fuel		Gas	[gas, oil, biomass]			
Nominal steam capa	acity		[tons/hour]			
Size of boiler		3,935	[MWth]			
Boiler Pressure						
level		16	[barg] (pressure refer	red to atmosphere (1 bar absolute	e)	
Boiler operation		4500	[hours/year]			
Kind of control			[CO/O ₂]			
Exhaust Gas Temper	rature	220before	[°C] after			
		ECO	economizers	economizer	yes	Yes no
O ₂ level in exhaust g	as in	4	[%]			
Rate of condensate	return		[%]	at [temperature of condensate re	eturn]	[°C]
Rate of direct used s	steam		[%]			
Leakage detection s	team traps yes	yes	no	frequenc	cy	1 [times/year]

General							
information				Information Steam S	ystem		_
				Installed			
Country	Austria			Capacity		1,95	[MWth]
Company number	13			System	Open	Х	Closed
Sector	Laundry						
-	k Data (prioritized by S		1 -				
Efficiency of steam b		89,7					
Steam production e	•		[GJ/GJ]				
- Alternativ when ab			[m ³ gas/m3 feed in w		e of feed in wa	ter]	[°C]
- Alternativ when ab	ove not available		[m ³ gas/kg fresh wate	-			
			[kg steam/ per produ	ct (piece, kg,			
Overall steam use e	fficiency		m2)]				
- Alternativ when ab	ove not available		[m ³ gas for steam boi	ler / per product(piec	e, kg, m²)]		
	ark Data (collect when	available)	1				
Kind of fuel		Gas	[gas, oil, biomass]				
Nominal steam capa	acity	2,6	[tons/hour]				
Size of boiler		1,95	[MWth]				
Boiler Pressure							
level		16	[barg] (pressure refer	red to atmosphere (1	bar absolute)		
Boiler operation		5000	[hours/year]				
Kind of control		Modulated	[CO/O ₂]				
Exhaust Gas Temper	rature	227		s econo	omizer	yes	no No
O ₂ level in exhaust g	as in	3,5					
Rate of condensate	return	- / -		at [temperature of co	ondensate retu	rn]	[°C]
Rate of direct used s	steam		[%]			-	
Leakage detection s	team traps yes	x	no		frequency		1 [times/year]
	, yes				nequency		

General								
information				Informa	ation Steam System			
				Installe	t			
Country	Austria			Capacity	y		3,26 [MWth]	
Company number	14			System		Open X	Closed	
Sector	Laundry							
Primary Bench Mar	k Data (prioritized by S	Steam Up partn	ers)					
Efficiency of steam b	ooiler	88,5	[%]					
Steam production e	fficiency		[GJ/GJ]					
- Alternativ when ab	ove not available		[m ³ gas/m3	feed in water] at	[temperature of feed	d in water]		[°C]
- Alternativ when ab	ove not available		[m ³ gas/kg	fresh water for ste	eam]			
			[kg steam/	per product (piece	e, kg,			
Overall steam use et	fficiency		m2)]					
- Alternativ when ab	ove not available		[m ³ gas for	steam boiler / per	product(piece, kg, m	²)]		
Additional Bench M	ark Data (collect whe	n available)						
Kind of fuel		Gas	[gas, oil, bio	omass]				
Nominal steam capa	acity		[tons/hour]					
Size of boiler		3,26	[MWth]					
Boiler Pressure								
level		14	[barg] (pres	sure referred to a	tmosphere (1 bar ab	solute)		
Boiler operation		4500	[hours/year	·]				
Kind of control		Modulated	[CO/O ₂]					
Exhaust Gas Temper	rature	229before	. , .,					
		ECO	[°C] after eo	conomizers	economizer		yes Yes	no
O ₂ level in exhaust g	as in	4.6	[%]					
Rate of condensate	return	.,,,	[%]	at [tem	perature of condensa	te return]		[°C]
Rate of direct used s	steam		[%]				L	1
Leakage detection s		yes	no		fron	uency	1	[times/year]
	yes	yes			печ	ucity	1	
	ycs	,			in equ	acticy		

General							
information				Information Steam Sy	/stem		_
				Installed			
Country	Austria			Capacity		1,3	[MWth]
Company number	15			System	Open 🔉	(Closed
Sector	Laundry						
Primary Bench Mar	k Data (prioritized by S	Steam Up par	rtners)				
Efficiency of steam b	poiler	93,5	[%]				
Steam production e	fficiency		[GJ/GJ]				
- Alternativ when ab	ove not available		[m ³ gas/m3 feed in w	ater] at [temperature o	of feed in wate	r]	[°C]
- Alternativ when ab	ove not available		[m ³ gas/kg fresh wate	er for steam]			
Overall steam use ef	fficiency		[kg steam/ per produ	ct (piece, kg, m2)]			
- Alternativ when ab	ove not available		[m ³ gas for steam boi	ler / per product(piece,	kg, m²)]		
			<u> </u>		-		
Additional Bench M	ark Data (collect whe	n available)					
Kind of fuel		Gas	[gas, oil, biomass]				
Nominal steam capa	acity	2	[tons/hour]				
Size of boiler		1,3	[MWth]				
Boiler Pressure							
level		13	[barg] (pressure refer	red to atmosphere (1 k	oar absolute)		
Boiler operation		4500	[hours/year]				
Kind of control		Modulated	[CO/O ₂]				
Exhaust Gas Temper	rature		[°C] after				
		125	economizers	econo	omizer	yes	X no
O ₂ level in exhaust g	as in	4	[%]				
Rate of condensate	return		[%]	at [temperature of co	ndensate retur	n]	[°C]
Rate of direct used s	steam		[%]	-			
Leakage detection st	team traps yes	Х	no]	frequency		1 [times/year]
	,			-			

General							
information				Information	Steam System		
				Installed			
Country	Austria			Capacity		2	[MWth]
Company number	16			System	Open		Closed
Sector	Laundry						
Duimen Devek Men	le Data (aviavitia ad lav		the even				
-	k Data (prioritized by		1 2				
Efficiency of steam l		91,5					
Steam production e	•		[GJ/GJ]				
- Alternativ when ab					erature of feed in water]		[°C]
- Alternativ when ab			[m ³ gas/kg fresh w	-			
Overall steam use e	fficiency		[kg steam/ per pro	duct (piece, kg, m	2)]		
- Alternativ when at	ove not available		[m ³ gas for steam	boiler / per produc	ct(piece, kg, m²)]		
			-				
Additional Bench M	ark Data (collect whe	n available)					
Kind of fuel		Gas	[gas, oil, biomass]				
Nominal steam capa	acity	3,2	[tons/hour]				
Size of boiler			[MWth]				
Boiler Pressure							
level		13	[barg] (pressure re	eferred to atmosph	ere (1 bar absolute)		
Boiler operation		4500	[hours/year]				
Kind of control		Modulated	-				
Exhaust Gas Temper	rature	170		7ers	economizer	yes	X no
O_2 level in exhaust g				20.5		yes	
Rate of condensate		7	[%]			1	
			[%]	at [temperat	ure of condensate return	IJ	[°C]
Rate of direct used s			[%]		<i>.</i>		
Leakage detection s	team traps yes	X	no		frequency		1 [times/year]

information				Informatio			
				iniorinatio	n Steam System		-
				Installed			
· · ·	Austria			Capacity		7,41	[MWth]
	Kunde						
	17			System	Open	Х	Closed
Sector	Kesselhaus						
Primary Bench Mark	Data (prioritized by S	Steam Up par	tners)				
Efficiency of steam bo		89,1	-				
Steam production eff			[G]/G]				
- Alternativ when abo	•			in waterl at [te	emperature of feed in wa	terl	[°C]
- Alternativ when abo			[m ³ gas/kg fresh				
			[kg steam/ per p				
Overall steam use eff	iciency		m2)]				
- Alternativ when abc	ve not available		[m ³ gas for stean	n boiler / per pr	oduct(piece, kg, m ²)]		
				<i>,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Additional Bench Ma	rk Data (collect wher	n available)					
Kind of fuel	,	Gas	[gas, oil, biomass	1			
Nominal steam capac	ity		[tons/hour]	-			
Size of boiler			[MWth]				
Boiler Pressure							
level		13	[barg] (pressure	eferred to atm	osphere (1 bar absolute)	1	
Boiler operation		4500	[hours/year]				
Kind of control		Modulated	[CO/O ₂]				
Exhaust Gas Tempera	ture		[°C] after econor	nizers	economizer	yes	Yes no
O ₂ level in exhaust ga	s in	2,8	[%]				
Rate of condensate re	eturn		[%]	at [temper	ature of condensate retu	ırn]	[°C]
Rate of direct used st	eam		[%]				t - j
Leakage detection ste	eam traps yes		no		frequency		[times/year]
_	,	J	-		- 1		

General							
information				Information	Steam System		
				Installed		NOT	
Country	ITALY			Capacity		AVAILABLE	[MWth]
Company number	1			System	Open		Closed X
Sector	PAPER MILL						
Primary Bench Mar	k Data (prioritized by S	team Up partn	ers)				
Efficiency of steam b	boiler	90%	[%]				
Steam production e	fficiency	NOT AVAILABLE	[GJ/GJ]				
- Alternativ when ab	oove not available		[m ³ gas/m3 fee	d in water] at [ten	nperature of feed in v	vater]	80 [°C]
- Alternativ when ab	oove not available		[m ³ gas/kg fres	h water for steam]			
			[kg steam/ per	product (piece, kg,			
Overall steam use et	fficiency	1,6	m2)]				
- Alternativ when ab	oove not available		[m ³ gas for stea	m boiler / per pro	duct(piece, kg, m²)]		
Additional Bench M	lark Data (collect when	available)					
Kind of fuel		GAS	[gas, oil, bioma	ss]			
Nominal steam capa	acity	80	[tons/hour]	<u>3 BOILERS</u>			
Size of boiler			[MWth]				
Boiler Pressure							
level		10	[barg] (pressure	e referred to atmos	sphere (1 bar absolut	e)	
Boiler operation		8300	[hours/year]				
Kind of control			[CO/O ₂]				
Exhaust Gas Temper	rature		[°C] after econd	omizers	economizer	ye	no no
O ₂ level in exhaust g	gas in		[%]			,	
Rate of condensate	return	95	[%]	at [temperat	ture of condensate re	turnl	80 [°C]
Rate of direct used s	steam		[%]				
Leakage detection s	team traps yes	Х	no		frequency		n.a. [times/year]
5	, , , , , , , , , , , , , , , , , , , ,						[

General									
information				Inf	ormation Stean	n System			
				Ins	stalled		NOT		
Country	ITALY			Ca	pacity		AVAILABLE	[MWth]	_
Company number	2			Sys	stem	Open		Closed X	
Sector	PAPER MILL								
Primary Bench Mar	k Data (prioritized by S	Steam Up p	artners)						
Efficiency of steam b	poiler	92%	[%]						
Steam production e	fficiency		[GJ/GJ]						
- Alternativ when ab	ove not available		[m³ gas/m3	B feed in wate	er] at [temperat	ure of feed in wa	iter]	[°C]	
- Alternativ when ab	ove not available		[m³ gas/kg	fresh water f	or steam]				
				per product (-				
Overall steam use et	fficiency	1,4	m2)]						
- Alternativ when ab	ove not available		[m ³ gas for	steam boiler	/ per product(p	iece, kg, m²)]			
			_			-			
Additional Bench M available)	ark Data (collect whe	n							
Kind of fuel		GAS	[gas, oil, bi	omassl					
Nominal steam capa	acity	19	-						
Size of boiler	/	15	[MWth]	1					
Boiler Pressure									
level		10	[barg] (pre	ssure referred	d to atmosphere	(1 bar absolute))		
Boiler operation			[hours/yea						
Kind of control			[CO/O ₂]	-					
Exhaust Gas Temper	rature	105		conomizers	ec	onomizer	ye	es X no	b
O ₂ level in exhaust g	as in		[%]						
Rate of condensate	return	95		at	Itemperature of	condensate retu	ırnl	70 [°C]	
Rate of direct used s			[%]						
Leakage detection s	team traps yes		no			frequency		[times/y	ear]
-	,	<u> </u>							,

General									
information				Info	ormation Steam S	System			
				Inst	talled		NOT		
Country	ITALY			Сар	pacity		AVAILABLE	[MWth]	
Company number	3			Sys	tem	Open		Closed	x
Sector	PAPER MILL								
Primary Bench Mar	k Data (prioritized by S	Steam Up pa	rtners)						
Efficiency of steam b	poiler	91%	[%]						
Steam production e	fficiency	NOT AVAILABLE	[GJ/GJ]						
- Alternativ when ab	ove not available		[m ³ gas/m	3 feed in wate	r] at [temperatur	e of feed in wa	iter]	80	[°C]
- Alternativ when ab	ove not available		[m ³ gas/kg	fresh water fo	or steam]				
			[kg steam/	per product (p	piece, kg,				
Overall steam use et	fficiency	1,5	m2)]						
- Alternativ when ab	ove not available		[m ³ gas for	steam boiler ,	/ per product(pied	ce, kg, m²)]			
Additional Bench M	ark Data (collect when	n available)							
Kind of fuel		GAS	[gas, oil, bi	omass]					
Nominal steam capa	acity	6	[tons/hour	·]					
Size of boiler			[MWth]						
Boiler Pressure									
level		11	[barg] (pre	ssure referred	to atmosphere (1 bar absolute)		
Boiler operation		8100	[hours/yea	ır]					
Kind of control			[CO/O ₂]						
Exhaust Gas Temper	rature	105	[°C] after e	conomizers	econ	omizer	ye	s x	no
O ₂ level in exhaust g	as in		[%]				-		
Rate of condensate	return		[%]	at [temperature of co	ondensate retu	urn]		[°C]
Rate of direct used s	steam		[%]	-			-		
Leakage detection s	team traps yes		no			frequency			[times/year]
		L	L L						

General							
information				Informa	tion Steam System		
				Installed		NOT	
Country	ITALY			Capacity	,	AVAILABI	LE [MWth]
Company number	4			System	C)pen	Closed X
Sector	PAPER MILL						
Primary Bench Mar	k Data (prioritized by S	team Up partne	ers)				
Efficiency of steam	boiler	91%	[%]				
Steam production e	fficiency	NOT AVAILABLE	[GJ/GJ]				
- Alternativ when al	oove not available		[m³ gas/m3	feed in water] at	[temperature of feed i	n water]	70/80 [°C]
- Alternativ when al	oove not available		[m³ gas/kg f	resh water for ste	am]		
			[kg steam/	per product (piece	, kg,		
Overall steam use e	fficiency	n.a.	m2)]				
- Alternativ when al	oove not available		[m ³ gas for	steam boiler / per	product(piece, kg, m ²)]	
Additional Bench N	1ark Data (collect wher	n <mark>available)</mark>					
Kind of fuel		GAS	[gas, oil, bic	mass]			
Nominal steam capa	acity	from 55 to					
		80	[tons/hour]				
Size of boiler			[MWth]				
Boiler Pressure							
level					mosphere (1 bar abso	olute)	
Boiler operation		8300	[hours/year]			
Kind of control			[CO/O ₂]				
Exhaust Gas Tempe	rature		[°C] after ec	onomizers	economizer		yes X no
O_2 level in exhaust g	gas in		[%]				
Rate of condensate	return	95	[%]	at [temp	erature of condensate	return]	70/80 [°C]
Rate of direct used	steam		[%]			-	
Leakage detection s	steam traps yes	5	no		freque	ency	[times/year]
	,		· L			-	

General									
information				In	nformation Ste	am System			
				In	nstalled		NOT		
Country	ITALY			C	apacity		AVAILAB	_{LE} [MWth]	
Company number	5			S	ystem	Ope	en	Closed	
Sector	REFINERY								
Primary Bench Marl	Data (prioritized by S	team Up pa	artners)						
Efficiency of steam b	oiler	92%	[%]						
Steam production ef	ficiency	n.a.	[GJ/GJ]						
- Alternativ when ab	ove not available		[m ³ gas/m3	B feed in wat	ter] at [tempe	rature of feed in	water]		[°C]
- Alternativ when ab	ove not available		[m³ gas/kg	fresh water	for steam]				_
			[kg steam/	per product	: (piece, kg,				
Overall steam use ef	ficiency		m2)]						
- Alternativ when ab	ove not available		[m ³ gas for	steam boile	r / per product	(piece, kg, m ²)]			
Additional Bench M available)	ark Data (collect when								
Kind of fuel		GAS	[gas, oil, bi	omass]					
Nominal steam capa	city	31	[tons/hour	-					
Size of boiler		24	[MWth]	-					
Boiler Pressure									
level		15	[barg] (pre	ssure referre	ed to atmosphe	ere (1 bar absolu	te)		
Boiler operation		8300	[hours/yea	r]					
Kind of control			[CO/O ₂]						
Exhaust Gas Temper	ature	150		conomizers		economizer		yes X	no
O ₂ level in exhaust g	as in		[%]						
Rate of condensate	return		[%]	ai	t [temnerature	of condensate re	eturnl	110	[°C]
Rate of direct used s			[%]	u				110	
Leakage detection st		x	no			frequen	cv	1	[times/year]
	yes	^]		пециен	~ 1	±	

General										
information				Informa	tion Steam System					
				Installed		NOT				
Country	ITALY			Capacity	,	AVAILA	_{BLE} [MWth]			
Company number	6			System		Open	Closed	Х		
Sector	PAPER MILL									
Primary Bench Mar	k Data (prioritized by S	Steam Up pa	rtners)							
Efficiency of steam b	poiler	90%	[%]							
Steam production e	fficiency	NOT AVAILABLE	[GJ/GJ]							
- Alternativ when ab	ove not available		[m³ gas/m3	feed in water] at	[temperature of feed	d in water]	105	[°C]		
- Alternativ when ab	ove not available		[m³ gas/kg f	resh water for ste	am]					
			[kg steam/ p	per product (piece	, kg,					
Overall steam use et	fficiency	1,3	m2)]							
- Alternativ when ab	- Alternativ when above not available [m ³ gas for steam boiler / per product(piece, kg, m ²)]									
Additional Bench M	ark Data (collect whe	n available)								
Kind of fuel		GAS	[gas, oil, bio	mass]						
Nominal steam capa	acity	21,6	[tons/hour]							
Size of boiler			[MWth]							
Boiler Pressure										
level		20	[barg] (pres	sure referred to a	mosphere (1 bar ab	solute)				
Boiler operation		8300	[hours/year]						
Kind of control			[CO/O ₂]							
Exhaust Gas Temper	rature		[°C] after ec	onomizers	economizer		yes	no		
O ₂ level in exhaust g	as in		[%]				•			
Rate of condensate	return	95	[%]	at [temp	erature of condensa	te return]	105	[°C]		
Rate of direct used s	steam		[%]	- •		-				
Leakage detection s	team traps yes		no		frequ	uency		[times/year]		
	,	L			·		L	· · · ·		

information Country ITA Company number 7 Sector PAF	LY PER MILL			Inform Installe Capacit System	У	NOT	ABLE	[MWth]	
Company number 7				Capacit	У	-	ABLE	[MWth]	
Company number 7				•		AVAIL	ABLE	[MWth]	
	PER MILL			System					
Sector PAF	PER MILL					Open		Closed X	
Primary Bench Mark Dat	a (prioritized by St	team Up partne	ers)						
Efficiency of steam boiler		91%	[%]						
Steam production efficien	ncy	NOT AVAILABLE	[GJ/GJ]						
- Alternativ when above i	not available		[m ³ gas/m	3 feed in water] at	[temperature of fee	d in water]		[°C]	
- Alternativ when above i	not available		[m ³ gas/kg	fresh water for st	eam]		-		
				/ per product (piec					
Overall steam use efficien	псу	0,7	m2)]						
- Alternativ when above i	not available		[m ³ gas for	r steam boiler / pe	r product(piece, kg, n	1 ²)]			
Additional Bench Mark	Data (collect when	available)							
Kind of fuel		GAS	[gas, oil, bi	iomass]					
Nominal steam capacity		12,5	[tons/hou	r]					
Size of boiler			[MWth]						
Boiler Pressure									
level		10	[barg] (pre	essure referred to a	atmosphere (1 bar ab	solute)			
Boiler operation		8400	[hours/yea	ar]					
Kind of control			[CO/O ₂]						
Exhaust Gas Temperature	e	165	[°C] after e	economizers	economizer		yes	X no	
O ₂ level in exhaust gas in			[%]				-		
Rate of condensate retur	n	95	[%]	at Item	perature of condensa	te returnl	Г	[°C]	
Rate of direct used steam	ı		[%]			- 1	L		
Leakage detection steam	traps yes		no		frea	uency	Г	[times/year]	
_	. ,	L]				· - /	L		

General											
information				Information Steam System							
				In	stalled		NOT				
Country	ITALY			C	apacity		AVAILABLE	[MWth]			
Company number	8			S	ystem	Oper	n	Closed	Х		
Sector	PAPER MILL										
	/ / /										
-	k Data (prioritized by S		-								
Efficiency of steam b	ooiler	90%	[%]								
Steam production ef	fficiency	NOT AVAILABLE	[GJ/GJ]								
- Alternativ when ab	ove not available		[m ³ gas/m	3 feed in wat	ter] at [temper	ature of feed in w	vater]		[°C]		
- Alternativ when ab	ove not available		[m³ gas/kg	fresh water	for steam]						
			[kg steam/	per product	(piece, kg,						
Overall steam use ef	ficiency	1,55	m2)]								
- Alternativ when ab	- Alternativ when above not available [m ³ gas for steam boiler / per product(piece, kg, m ²)]										
Additional Bench M	ark Data (collect when	n available)									
Kind of fuel		GAS	[gas, oil, bi	omass]							
Nominal steam capa	city	60	[tons/hour	.]							
Size of boiler			[MWth]	-							
Boiler Pressure											
level		10	[barg] (pre	ssure referre	ed to atmosphe	re (1 bar absolut	e)				
Boiler operation		8100	[hours/yea	ar]							
Kind of control			[CO/O ₂]								
Exhaust Gas Temper	ature			conomizers		economizer	v	ves X	no		
O ₂ level in exhaust g	as in		[%]				,	L	. <u>L</u>		
Rate of condensate	return	95	[%]	at	t [temperature	of condensate re	turn]		[°C]		
Rate of direct used s	team		[%]		-		-	L	<u>.</u>		
Leakage detection st	team traps yes		no			frequency	y		[times/year]		
	,	L	L			• •	•	L], ,		

General										
information				I	nformation Ste	eam System				
				I	nstalled		NOT			
Country	ITALY			(Capacity		AVAILABLE	[MWth]		
Company number	9			9	System	Ope	n	Closed	Х	
Sector	PAPER MILL									
Primary Bench Mar	k Data (prioritized by S	Steam Lin na	rtnors)							
-										
Efficiency of steam	boller	90%	[%]							
Steam production e	fficiency	AVAILABLE	[GJ/GJ]						_	
- Alternativ when at	oove not available		[m ³ gas/m	3 feed in wa	ater] at [tempe	rature of feed in v	vater]		[°C]	
- Alternativ when at	oove not available		[m³ gas/kg	fresh water	r for steam]					
			[kg steam/	per produc	ct (piece, kg,					
Overall steam use e	fficiency	1,3	m2)]							
- Alternativ when at	- Alternativ when above not available [m ³ gas for steam boiler / per product(piece, kg, m ²)]									
			_							
Additional Bench N	lark Data (collect whe	n available)								
Kind of fuel		GAS	[gas, oil, bi	omass]						
Nominal steam capa	acity	7,5	[tons/hour	.]						
Size of boiler			[MWth]							
Boiler Pressure										
level		10	[barg] (pre	ssure referr	red to atmosph	ere (1 bar absolut	:e)			
Boiler operation		8250	[hours/yea	ar]						
Kind of control			[CO/O₂]							
Exhaust Gas Tempe	rature			conomizers	5	economizer	v	ves 🛛	no	
O ₂ level in exhaust g			[%]				,			
Rate of condensate	-	95	[%]	-	at [temperature	e of condensate re	turnl		[°C]	
Rate of direct used			[%] [%]	c			turij			
Leakage detection s			Γ			frequenc	V		[times/yea	arl
Leanage acteenon 5	team traps yes		no			nequenc	у			aij

General										
information			Information Steam System							
				Installed		NOT				
Country	ITALY			Capacity	,	AVAILAB	BLE [MWth]			
Company number	10			System	C	Open	Closed X			
Sector	PAPER MILL									
Primary Bench Marl	k Data (prioritized by St	eam Up partne	ers)							
Efficiency of steam b	ooiler	92%	[%]							
Steam production ef	fficiency	NOT AVAILABLE	[GJ/GJ]							
- Alternativ when ab	ove not available		[m ³ gas/m	3 feed in water] at	[temperature of feed	in water]	[°C]			
- Alternativ when ab	ove not available		[m ³ gas/kg	fresh water for ste	am]					
			[kg steam/	/ per product (piece	, kg,					
Overall steam use ef	ficiency	1,38	m2)]							
- Alternativ when ab	ove not available		[m ³ gas foi	r steam boiler / per	product(piece, kg, m ²	²)]				
Additional Bench M	ark Data (collect when	available)								
Kind of fuel		GAS	[gas, oil, bi	iomass]						
Nominal steam capa	city	26	[tons/hou	r]						
Size of boiler			[MWth]							
Boiler Pressure										
level					mosphere (1 bar abs	olute)				
Boiler operation		8400	[hours/yea	ar]						
Kind of control			[CO/O ₂]							
Exhaust Gas Temper	ature	130	[°C] after e	economizers	economizer		yes X no			
O ₂ level in exhaust g	as in		[%]							
Rate of condensate	return	95	[%]	at [tem	erature of condensat	e return]	[°C]			
Rate of direct used s	team		[%]			-				
Leakage detection st	team traps yes		no		frequ	ency	[times/year]			
	,	J	Ľ		- 1-					

General information					Informatio	on Steam Syst	em			
	Czech				Installed					
Country	Republic				Capacity			393	[MWth]	
Company number	1				System		Open		Closed	
	Pulp and									
Sector	paper									
Primary Bench Mark Data (p	prioritized by St									
Efficiency of steam boiler		87	[%]							
Steam production efficiency		0.12	[GJ/GJ]							
- Alternativ when above not	available		[m ³ gas/m	3 feed in w	vater] at [te	emperature of	feed in wate	r]	145 [°	C]
- Alternativ when above not	available		[m³ gas/k	g fresh wate	er for stean	n]				
Overall steam use efficiency		22.261	GJ/Tons o	f product						
- Alternativ when above not	available		[m ³ gas fo	r steam boi	iler / per pr	oduct(piece, k	(g, m²)]			
Additional Bench Mark Data	a (collect when	available)								
Kind of fuel		biomass	[gas, oil, b	iomass]						
Nominal steam capacity			[tons/hou	r]						
Size of boilers		393.5	[MWth]							
Boiler Pressure level		85	[barg] (pre	essure refei	rred to atm	osphere (1 ba	ar absolute)			
Boiler operation		8000	[hours/ye							
Kind of control			$[CO/O_2]$	-						
Exhaust Gas Temperature		140	• • ••	economizer	rs	econom	nizer	yes	X	no
O ₂ level in exhaust gas in		4	[%]					,		
Rate of condensate return		74	[%]		at [temper	rature of cond	ensate returi	ןו	90 [°0	2]
Rate of direct used steam		-	[%]					-		-
Leakage detection steam tra	ps yes	х	no				frequency		2 [ti	mes/year]
		L			I		. ,		·	- .

General information				Infor	mation Steam Sys	stem		
				Instal	led			
Country	Czech Republic			Capa	city		47,91	[MWth]
Company number	2			Syste	m	Open		Closed
	Chemical							
Sector	industry							
Primary Bench Mark Data (prioritized by Stea	m Up partn	ers)					
Efficiency of steam boiler		67	[%]					
Steam production efficiency		1,49	[GJ/GJ]					
- Alternativ when above not	available		[m ³ gas/m3	feed in water]	at [temperature	of feed in wat	er]	[°C]
- Alternativ when above not	available		[m³ gas/kg f	fresh water for	steam]			
Overall steam use efficiency			GJ/Tons of	product				
- Alternativ when above not	available		[m ³ gas for a	steam boiler / p	er product(piece,	, kg, m²)]		
			-			-		
Additional Bench Mark Data	a (collect when ava	ailable)						
Kind of fuel		lignite	[gas, oil, bic	omass]				
Nominal steam capacity		13,5	[tons/hour]					
Size of boilers		15,97	[MWth]					
Boiler Pressure level		20	[barg] (pres	sure referred to	atmosphere (1	bar absolute)		
Boiler operation		8000	[hours/year	·]				
Kind of control		all	[CO/O ₂]					
Exhaust Gas Temperature			[°C] after ec	conomizers	econo	mizer	yes	X no
O ₂ level in exhaust gas in		15,7					,	
Rate of condensate return		60	[%]	at [te	mperature of cor	ndensate retur	nl	90 [°C]
Rate of direct used steam			[%]]	<u> </u>
Leakage detection steam tra	ips yes	50	no x	<i>.</i>		frequency		[times/year]
	yes	L		<u> </u>		nequency		

General information					Information St	team System			
					Installed				
Country	Czech Republic				Capacity			332	[MWth]
Company number	3			:	System		Open 🗴	[Closed
	Chemical								
Sector	industry								
Primary Bench Mark Data (prioritized by Stea	m Up partn	ers)						
Efficiency of steam boiler		87	[%]						
Steam production efficiency	,	1,3	[GJ/GJ]						
- Alternativ when above not	available		[m ³ gas/m	3 feed in wa	ater] at [temp	erature of feed	in wate	r]	[°C]
- Alternativ when above not	available		[m³ gas/kg	g fresh wate	r for steam]				
Overall steam use efficiency			GJ/Tons o	f product					
- Alternativ when above not	available		[m ³ gas fo	r steam boil	er / per produ	ct(piece, kg, m ²)]		
			. 0				, -		
Additional Bench Mark Data	a (collect when ava	ailable)							
Kind of fuel		coal	[gas, oil, b	iomass]					
Nominal steam capacity		405	[tons/hou	r]					
Size of boilers		332	[MWth]	-					
Boiler Pressure level		92	[barg] (pre	essure referi	ed to atmosph	here (1 bar abs	olute)		
Boiler operation			[hours/yea			·			
Kind of control		all	[CO/O ₂]	-					
Exhaust Gas Temperature		140 -	[00/02]						
		170	[°C] after e	economizers	5	economizer		yes	X no
O ₂ level in exhaust gas in		2 - 10	[%]						
Rate of condensate return		40	[%]	;	at [temperatu	re of condensat	e return	1	50 [°C]
Rate of direct used steam			[%]		p				L
Leakage detection steam tra	ips yes		no			freau	Jency		4 [times/year]
	,	L					1		

General information				Information S	Steam System			
	Czech			Installed]	
Country	Republic			Capacity		22	[MWth]	
Company number	4			System	Open	х	Closed	
	Food							
Sector	industry							
Duine w. Densk Marile Data (r			the own					
Primary Bench Mark Data (p	prioritized by St		-					
Efficiency of steam boiler			[%]					
Steam production efficiency		1,4	[GJ/GJ]					
- Alternativ when above not					perature of feed in wat	er]	[°C]	
- Alternativ when above not	available			h water for steam]				
Overall steam use efficiency		0	GJ/Tons of pro	duct				
- Alternativ when above not	available		[m ³ gas for stea	am boiler / per produ	uct(piece, kg, m²)]			
	/							
Additional Bench Mark Data	i (collect when		r	1				
Kind of fuel		gas	[gas, oil, bioma	SS]				
Nominal steam capacity			[tons/hour]					
Size of boilers			[MWth]					
Boiler Pressure level				e referred to atmosp	here (1 bar absolute)			
Boiler operation		8760	[hours/year]					
Kind of control		all	[CO/O ₂]					
Exhaust Gas Temperature		130 -						
		150	[°C] after econo	omizers	economizer	yes	X no	D
O ₂ level in exhaust gas in		8 - 10	[%]					
Rate of condensate return		50	[%]	at [temperatu	ire of condensate retui	n]	70 [°C]	
Rate of direct used steam		35	[%]	- •		-		
Leakage detection steam tra	ps yes		no x		frequency		[times/y	ear]
	,		L		1 /			

General information				I	nformation Ste	am System	_		
	Czech			I	nstalled				
Country	Republic			(Capacity			16 [MWth]	
Company number	5			9	System	Ор	en x	Closed	
	Dairy								
Sector	industry								
Primary Bench Mark Data (p	prioritized by St	eam Up pai	rtners)						
Efficiency of steam boiler		90	[%]						
Steam production efficiency		1,1	[GJ/GJ]						
- Alternativ when above not	available		[m ³ gas/m	3 feed in wa	ter] at [temper	rature of feed in	water]	['	C]
- Alternativ when above not	available		[m³ gas/kg	fresh water	for steam]				
Overall steam use efficiency		0	GJ/Tons of	product					
- Alternativ when above not	available		[m ³ gas fo	r steam boile	er / per product	t(piece, kg, m²)]			
			. 0		, , ,				
Additional Bench Mark Data	(collect when	available)							
Kind of fuel	-	gas	[gas, oil, b	iomass]					
Nominal steam capacity			[tons/hou	·]					
Size of boilers		16	[MWth]						
Boiler Pressure level		15	[barg] (pre	ssure referr	ed to atmosphe	ere (1 bar absolu	te)		
Boiler operation			[hours/yea						
Kind of control		all	[CO/O ₂]						
Exhaust Gas Temperature		150 -							
		180	[°C] after e	conomizers		economizer		yes X	no
O ₂ level in exhaust gas in		4-8	[%]						
Rate of condensate return		80	[%]	ā	at [temperature	of condensate r	eturn]	50 [°	c]
Rate of direct used steam		15	[%]		·		-	· · · · · · · · · · · · · · · · · · ·	
Leakage detection steam tra	ps yes		no	х		frequen	ю	[ti	imes/year]
			I			•	-	· -	

General informat	ion			Information Steam System						
					Installed					
Country	Czech Republic				Capacity			31 [N	MWth]	
Company										
number	6				System	Oţ	ben		Closed x	
Sector	Machinery									
Primary Bench M	ark Data (prioritized by Stean	Up partne	rs)							
Efficiency of stear	n boiler	88	[%]							
Steam production	n efficiency	1,2	[GJ/GJ]							
- Alternativ when	above not available		[m³ gas/m	13 feed in wa	ater] at [temp	erature of feed in	water]		[°C]	
- Alternativ when	above not available		[m³ gas/k	g fresh wate	r for steam]					
Overall steam use	e efficiency		GJ/Tons o	f product						
- Alternativ when	above not available		[m³ gas fo	r steam boil	er / per produ	ct(piece, kg, m ²)]				
Additional Bench	Mark Data (collect when ava	lable)								
Kind of fuel		gas	[gas, oil, b	iomass]						
Nominal steam ca	apacity	45	[tons/hou	r]						
Size of boilers		31	[MWth]							
Boiler Pressure lev	vel	8	[barg] (pr	essure refer	red to atmospl	here (1 bar absolu	ute)			
Boiler operation		8300	[hours/ye	ar]						
Kind of control		all	[CO/O ₂]							
Exhaust Gas Temp	perature	150 -	[00/02]							
		180	[°C] after	economizers	S	economizer	У	ves X	no	
O ₂ level in exhaus	t gas in	8-10	[%]				-			
Rate of condensat	te return	90	[%]		at [temperatu	re of condensate r	eturn]		<mark>85</mark> [°C]	
Rate of direct use	d steam	0	[%]							
Leakage detection	n steam traps yes	x	no			freque	ncy		1 [times/year]	

General						
information				Information Ste	am System	
				Installed		
Country	Greece			Capacity		[MWth]
Company number				System	Open	Closed
Sector	food processing-cold	cuts				
Primary Bench Mar	k Data (prioritized by S	team Up pa	rtners)			
Efficiency of steam			[%]			
Steam production e			[G]/G]			
- Alternativ when at	•			vatori at Itompo	ature of feed in water]	[°C]
- Alternativ when at		-	[m ³ gas/kg fresh wat		ature of feed in waterj	
- Alternativ when at	ove not available	-	[kg steam/ per produ	-		
Overall steam use e	fficiency		[kg steally per prout [m2)]	ici (piece, kg,		
- Alternativ when at				ilor / por product	$(n) = k \pi m^2 \sqrt{1}$	
- Alternativ when at	ove not available		[m ³ gas for steam bo	mer / per product	(piece, kg, m)]	
Additional Bench M	lark Data (collect when	available)				
Kind of fuel			[gas, oil, biomass]			
Nominal steam capa	acity	11	[tons/hour]			
Size of boiler			[MWth]			
Boiler Pressure						
level		7	[barg] (pressure refe	rred to atmosphe	ere (1 bar absolute)	
Boiler operation			[hours/year]			
Kind of control			[CO/O ₂]			
Exhaust Gas Tempe	rature	175	[°C] after economize	rs	economizer	yes no
O_2 level in exhaust g		1/5				
Rate of condensate	-	-	[%]	at [tamagentum]	of condensate return 1	
Rate of direct used s			[%]	at [temperature	of condensate return]	98 [°C]
Leakage detection s		50 VFC	[%]	1	fue e	
LEARAGE UELECTION S	team traps yes	YES	no	J	frequency	2 [times/year]

General											
information				Information Steam System							
				Insta							
Country	Greece			Сара			[MWth]				
Company number				Syste	m	Open	Closed				
Sector	food processing - che	ese products									
Primary Bench Marl	Contract (Contraction of the second structure of the	eam Up partne	ers)								
Efficiency of steam b	ooiler	93& 92	[%]								
Steam production ef	ficiency	-	[GJ/GJ]								
- Alternativ when ab	ove not available	-	[m³ gas/m	n3 feed in water]	at [temperature of	feed in water	·] [°C]				
- Alternativ when ab	ove not available	-	[m³ gas/k	g fresh water for	steam]						
			[kg steam	/ per product (pi	ece, kg,						
Overall steam use ef	ficiency		m2)]								
- Alternativ when ab	ove not available		[m ³ gas fo	r steam boiler / J	per product(piece, k	g, m²)]					
Additional Bench M	ark Data (collect when	available)									
Kind of fuel		LPG	[gas, oil, b	oiomass]							
Nominal steam capa	city	3&2	[tons/hou	r]							
Size of boiler		3,023&1,512	[MWth]								
Boiler Pressure											
level		7			o atmosphere (1 bai	r absolute)					
Boiler operation		8760	[hours/ye	ar]							
Kind of control		02	[CO/O ₂]								
Exhaust Gas Temper	ature	182 & 176	[°C] after	economizers	economiz	zer	yes no				
O ₂ level in exhaust g	as in	5,7 &4,5	[%]								
Rate of condensate	return	-	[%]	at [te	mperature of conde	nsate return]] [°C]				
Rate of direct used s	team	-	[%]								
Leakage detection st	eam traps yes	YES	no		f	requency	1 [times/year]				

General				
information			Information Steam System	
			Installed	
Country	Greece		Capacity [MWth]	
Company number			System Open Closed	
Sector	food processing - dair	y products		
•	k Data (prioritized by St			
Efficiency of steam	boiler	90	[%]	
Steam production e	fficiency	-	[GJ/GJ]	
- Alternativ when al	oove not available	-	[m ³ gas/m3 feed in water] at [temperature of feed in water]	[°C]
- Alternativ when al	oove not available	-	[m ³ gas/kg fresh water for steam]	
			[kg steam/ per product (piece, kg,	
Overall steam use e	fficiency		m2)]	
- Alternativ when al	oove not available		[m ³ gas for steam boiler / per product(piece, kg, m ²)]	
Additional Bench N	1ark Data (collect when	available)		
	·	LPG,		
Kind of fuel		electricity	[gas, oil, biomass]	
Nominal steam cap	acity	1,6	[tons/hour]	
Size of boiler		1	[MWth]	
Boiler Pressure				
level			[barg] (pressure referred to atmosphere (1 bar absolute)	
Boiler operation		2000	[hours/year]	
Kind of control		O2/co2	[CO/O ₂]	
Exhaust Gas Tempe	rature	240	[°C] after economizers economizer yes	no
O ₂ level in exhaust §	gas in	6	[%]	
Rate of condensate	return	-		[°C]
Rate of direct used	steam	_		
Leakage detection s	steam traps yes	YES		[times/year]
-				,, - <u>,</u>
l				

General							
information				Information Stea	m System		
				Installed			
Country	NL			Capacity	-	na	[MWth]
Company number	1			System	Open	5	Closed 95
Sector	Plastics processing						
Primary Bench Marl	Contract of Contract Contra	team Up pa	rtners)				
Efficiency of steam b	ooiler	na	[%]				
Steam production ef	ficiency	na	[GJ/GJ]				
- Alternativ when ab	ove not available	na	[m ³ gas/m3 feed in	water] at [tempera	ture of feed in wat	er]	[°C]
- Alternativ when ab	ove not available	na	[m ³ gas/kg fresh wa	ter for steam]		-	
			[kg steam/ per prod	uct (piece, kg,			
Overall steam use ef	ficiency	na	m2)]				
- Alternativ when ab	ove not available	na	[m ³ gas for steam b	oiler / per product(piece, kg, m²)]		
			-				
Additional Bench M	ark Data (collect when	available)					
Kind of fuel		gas	[gas, oil, biomass]				
Nominal steam capa	city	na	[tons/hour]				
Size of boiler		na	[MWth]				
Boiler Pressure							
level		8-12	[barg] (pressure ref	erred to atmospher	e (1 bar absolute)		
Boiler operation		na	[hours/year]				
Kind of control		na	[CO/O ₂]				
Exhaust Gas Temper	ature	na	[°C] after economize	ers e	conomizer	yes	no x
O ₂ level in exhaust g	as in	na	[%]			-	
Rate of condensate	return	95	[%]	at [temperature d	of condensate retu	rn]	168 [°C]
Rate of direct used s	team	5	[%]			- [
Leakage detection st	eam traps yes		no x	7	frequency	[[times/year]
-	. ,	L	L		, -,	L	

General										
information					Information S	team System				
					Installed					
Country	NL				Capacity		na		MWth]	
Company number	2				System		Open	14	Closed	86
Sector	Paper processing									
Primary Bench Mark	Data (prioritized by S	Steam Up p	artners)							
Efficiency of steam b	oiler	90,6	[%]							
Steam production ef	ficiency				(GJ gas en elek	ktra/ GJ water)				
- Alternativ when ab	ove not available	683,0565	[m ³ gas/m	3 feed in w	vater] at [temp	erature of feed	d in water]		15 [°C]	
- Alternativ when ab	ove not available		[m ³ gas/k	g fresh wate	er for steam]					
			[kg steam	/ per produ	ıct (piece, kg,					
Overall steam use ef	ficiency		m2)]							
- Alternativ when ab	ove not available	431	m3/ton							
	ark Data (collect whe	n								
available)		r								
Kind of fuel		gas	[gas, oil, b	-						
Nominal steam capa	city	na	[tons/hou	r]						
Size of boiler		na	[MWth]							
Boiler Pressure										
level		10			rred to atmosp	here (1 bar ab	solute)			
Boiler operation		na	[hours/ye	ar]						
Kind of control		na	[CO/O ₂]					_		
Exhaust Gas Temper	ature	na	[°C] after	economizei	rs	economizer		yes		no x
O ₂ level in exhaust g	as in	na	[%]							
Rate of condensate	return	86	[%]		at [temperatu	re of condensa	te return]		85 [°C]	
Rate of direct used s	team	14					-	L		
Leakage detection st	eam traps yes		no	х		freq	uency		[tim	es/year]
		L					·	L		

General							
information				Information Stea	m System		
				Installed			
Country	NL			Capacity		8,4	[MWth]
Company number	3			System	Open		Closed 100%
Sector	Plastic processing						
Primary Bench Marl	k Data (prioritized by Si	team Up pa	rtners)				
Efficiency of steam k		90	-				
Steam production ef		na	[GJ/GJ]				
- Alternativ when ab		na	[m ³ gas/m3 feed in v	-	iture of feed in wate	rj	[°C]
- Alternativ when ab	ove not available	na	[m ³ gas/kg fresh wat				
Overall steam use of	fficiency	22	[kg steam/ per prod m2)]	uct (piece, kg,			
Overall steam use ef	•	na	, <u>,</u>				
- Alternativ when ab	ove not available	94	m3/ton				
	ark Data (collect when						
Kind of fuel		gas	[gas, oil, biomass]				
Nominal steam capa	acity	na	[tons/hour]				
Size of boiler		2x4,2	[MWth]				
Boiler Pressure							
level		6-22	[barg] (pressure refe	erred to atmospher	e (1 bar absolute)		
Boiler operation		continu	[hours/year]				
Kind of control		na	[CO/O ₂]				
Exhaust Gas Temper	rature	na	[°C] after economize	ers e	conomizer	yes	no x
O ₂ level in exhaust g	as in	na	[%]				
Rate of condensate	return	100	[%]	at [temperature of	of condensate return]	[°C]
Rate of direct used s	steam	0	[%]			-	1
Leakage detection st	team traps yes		no]	frequency		0-1 [times/year]
-	,,	<u> </u>	L		is spoken of		

General			
information			Information Steam System
			Installed
Country	NL		Capacity 5,6 [MWth]
Company number	4		System Open 100% Closed 0%
Sector	Meat processing		
Primary Bench Mark	Data (prioritized by S	Steam Up p	partners)
Efficiency of steam b	ooiler	78	[%]
Steam production ef	ficiency		[G1/G1]
- Alternativ when ab	ove not available	na	[m ³ gas/m3 feed in water] at [temperature of feed in water] [°C]
- Alternativ when ab	ove not available	na	[m ³ gas/kg fresh water for steam]
			[kg steam/ per product (piece, kg,
Overall steam use ef	ficiency	na	m2)]
- Alternativ when ab	ove not available	na	[m ³ gas for steam boiler / per product(piece, kg, m ²)]
			_
	ark Data (collect whe	n	
available)		r	7
Kind of fuel		gas	[gas, oil, biomass]
Nominal steam capa	city	na	[tons/hour]
Size of boiler		2x2,8	[MWth]
Boiler Pressure			
level			[barg] (pressure referred to atmosphere (1 bar absolute)
Boiler operation		continu	[hours/year] in rest 5 bar
Kind of control		na	[CO/O ₂]
Exhaust Gas Temper	ature	na	[°C] after economizers economizer yes no x
O_2 level in exhaust g	as in	na	[%]
Rate of condensate	return	0	
Rate of direct used s	team		
Leakage detection st	eam traps yes		no x frequency [times/year]
	,	<u> </u>	

General											
information				1	Information Stea	am System					
Country	NL				Installed Capacit	ty		7,4	[MWth]		
Company number	5				System		Open	82	Closed	18	
Sector	Plastics processing										
Primary Bench Mark	Data (prioritized by St	eam Up pa	rtners)								
Efficiency of steam b	oiler	88,1	[%]								
Steam production ef	ficiency		[GJ/GJ]								
- Alternativ when ab	ove not available	73	[m³ gas/m	n3 feed in wa	iter] at [tempera	ature of feed	in water]			[°C]	
- Alternativ when ab	ove not available		[m³ gas/k	g fresh water	r for steam]						
Overall steam use ef	ficiency		[kg steam	/ per produc	t (piece, kg, m2)]]					
- Alternativ when ab	ove not available	141	m3gas/to	n							
			U								
Additional Bench M	ark Data (collect when	available)									
Kind of fuel		gas	[gas, oil, b	oiomass]							
Nominal steam capa	city	2x5	[tons/hou	r]							
Size of boiler				-	bruik (ander						
		2x3,7	[MWth]	droog)							
Boiler Pressure		6.5	[howa] (ww			va (1 havaha	-1				
level Boiler operation					ed to atmospher	re (i par apso	blute)				
Kind of control		na	[hours/ye	arj							
		na	[CO/O ₂]			Rookgascon		Г			
Exhaust Gas Temper		na	[°C] after	economizers		economizer		yes		no x	
O ₂ level in exhaust g	as in	na	[%]					_			
Rate of condensate r		18	[%]		at [temperature	of condensat	te return]			[°C]	
Rate of direct used s	team	82	[%]					,			
Leakage detection st	eam traps yes		no	x		frec	quency			[times/year]]

General						
information				Information Steam S	System	
				Installed		
Country	NL			Capacity		4,3 [MWth]
Company number	6			System	Open	80 Closed 20
Sector	Plastics processing					
Primary Bench Marl	Contract (A Data (prioritized by S	Steam Up p	artners)			
Efficiency of steam b	ooiler	75	[%]			
Steam production ef	ficiency	0,62	[GJ/GJ]			
- Alternativ when ab	ove not available	67-76	[m ³ gas/m3 feed ir	water] at [temperatur	e of feed in water]	? [°C]
- Alternativ when ab	ove not available		[m ³ gas/kg fresh w	ater for steam]		
			[kg steam/ per pro	duct (piece, kg,		
Overall steam use ef	ficiency		m2)]			
- Alternativ when ab	ove not available	126	m3gas/ton			
	ark Data (collect whe	า				
available)						
Kind of fuel	-1.	gas	[gas, oil, biomass]			
Nominal steam capa	city	na	[tons/hour]			
Size of boiler		4,3	[MWth]			
Boiler Pressure		-	[hard] (processo ro	formed to atmacphare (1 har abcaluta)	
level Boiler operation		-		ferred to atmosphere (1 Dar absolute)	
Kind of control		2000	[hours/year]			
		na	[CO/O ₂]			
Exhaust Gas Temper		na	[°C] after economi	zers econ	omizer	yes x no x
O ₂ level in exhaust g		na	[%]			
Rate of condensate	return	20	[%]	at [temperature of co	ondensate return]	[°C]
Rate of direct used s	team	80	[%]			
Leakage detection st	team traps yes	х	no		frequency	1 [times/year]

General						
information				Information Steam	System	
				Installed		
Country	NL			Capacity		0,45 [MWth]
Company number	7			System	Open	100 Closed
Sector	Meat processing					
Primary Bench Marl	Contract of the set o	team Up pa	rtners)			
Efficiency of steam b	ooiler	83	[%]			
Steam production ef	ficiency	na	[GJ/GJ]			
- Alternativ when ab	ove not available	na	[m ³ gas/m3 feed in	water] at [temperatu	ure of feed in water]	[°C]
- Alternativ when ab	ove not available	na	[m ³ gas/kg fresh wa	ter for steam]		
			[kg steam/ per prod	-		
Overall steam use ef	ficiency	na	m2)]			
- Alternativ when ab	ove not available	na	[m ³ gas for steam b	oiler / per product(pi	ece, kg, m²)]	
					-	
Additional Bench M	ark Data (collect when	available)				
Kind of fuel		gas	[gas, oil, biomass]			
Nominal steam capa	city	na	[tons/hour]			
Size of boiler		na	[MWth]			
Boiler Pressure						
level		na	[barg] (pressure ref	erred to atmosphere	(1 bar absolute)	
Boiler operation		na	[hours/year]			
Kind of control		na	[CO/O ₂]			
Exhaust Gas Temper	ature	na	[°C] after economize	ers ecc	onomizer	yes no x
O ₂ level in exhaust g	as in	na	[%]			
Rate of condensate	return	0	[%]	at [temperature of	condensate return]	[°C]
Rate of direct used s	team	100	[%]			
Leakage detection st	eam traps yes		no x	7	frequency	[times/year]
_	. ,	L	I L		, ,	

General									
information						Steam System			
					Installed				
Country	NL				Capacity			4,9 [MWth]	
Company number	8				System		Open	50 Closed 50	
Sector	Meat processing								
Primary Bench Mar	k Data (prioritized by	Steam Up p	artners)						
Efficiency of steam b	ooiler	80	[%]						
Steam production e	fficiency	na	[GJ/GJ]						
- Alternativ when ab	ove not available	na	[m³ gas/m	3 feed in w	ater] at [tem	perature of fee	ed in water]	na [°C]	
- Alternativ when ab	ove not available	na	[m ³ gas/kg	fresh wate	er for steam]				
			[kg steam/	' per produ	ct (piece, kg,				
Overall steam use ef	fficiency	na	m2)]						
- Alternativ when ab	ove not available	na	[m ³ gas foi	⁻ steam boi	ler / per proc	luct(piece, kg, r	n²)]		
Additional Bench M	ark Data (collect whe	n							
available)	,		_						
Kind of fuel		gas	[gas, oil, bi	omass]					
Nominal steam capa	icity	na	[tons/hou	·]					
Size of boiler		2,3+2,6	[MWth]						
Boiler Pressure									
level		7			red to atmos	phere(1 bar al	osolute)		
Boiler operation		na	[hours/yea	ar]					
Kind of control		na	[CO/O ₂]					On just 1 of the boilers	
Exhaust Gas Temper		na	[°C] after e	conomizer	S	economizer		yes x no x	
O ₂ level in exhaust g	as in	na	[%]						
Rate of condensate	return	50	[%]		at [temperat	ure of condens	ate return]	na [°C]	
Rate of direct used s	steam	50	[%]						
Leakage detection st	team traps yes		no	x		free	quency	[times/year]	

General								
information				Informatio	n Steam System			
				Installed				
Country	NL			Capacity			2,6 [MWth]	
Company number	9			System		Open	2	98
Sector	Paper processing							
Duine and Device Maryl								
-	Contract (Contract of the second se							
Efficiency of steam b		85	[%]					
Steam production ef	ficiency		[GJ/GJ]					
- Alternativ when ab	ove not available	393	[m ³ gas/m3 feed	in water] at [te	mperature of feed	d in water]	12 [°C]	
- Alternativ when ab	ove not available		[m ³ gas/kg fresh	water for steam]			
			[kg steam/ per p	roduct (piece, kg	5,			
Overall steam use ef	ficiency		m2)]					
- Alternativ when ab	ove not available	0,27	m3/kg paper (ov	er 1 year)				
Additional Bench M	ark Data (collect when	available)						
Kind of fuel		gas	[gas, oil, biomas	s]				
Nominal steam capa	city	4	[tons/hour]					
Size of boiler		2,6	[MWth]					
Boiler Pressure								
level		9	[barg] (pressure	referred to atmo	osphere (1 bar ab	solute)		
Boiler operation		5880	[hours/year]					
Kind of control		na	[CO/O ₂]					
Exhaust Gas Temper	ature	na	[°C] after econor	nizers	economizer		yes	no x
O ₂ level in exhaust g	as in	3-6	[%]					
Rate of condensate	return		[%]	at [tempera	ature of condensa	te return]	[°C]	
Rate of direct used s	team	2	[%]			-	· · ·	
Leakage detection st	team traps yes		no x		freq	uency	[time	es/year]
	,		L				·	· · -

General										
information				Information Steam System						
				Instal						
Country	NL			Capac	•		[MWth]			
Company number	10			Syste	m	Open	100 Closed			
Sector	Meat processing									
Primary Bench Mar	k Data (prioritized by	Steam Up p	partners)							
Efficiency of steam boiler			[%]							
Steam production et	fficiency	na	[GJ/GJ]							
- Alternativ when ab	ove not available	na	[m³ gas/m3 f	eed in water]	at [temperature of	feed in water]	[°C]			
- Alternativ when ab	ove not available	na	_	esh water for s	-	-				
			[kg steam/ per product (piece, kg,							
Overall steam use ef	fficiency	na	m2)]							
- Alternativ when ab	na	[m ³ gas for steam boiler / per product(piece, kg, m ²)]								
			_							
Additional Bench M available)	ark Data (collect whe	en								
Kind of fuel		gas	[gas, oil, bior	nass]						
Nominal steam capa	acity	na	[tons/hour]							
Size of boiler		na	[MWth]							
Boiler Pressure										
level		na	[barg] (pressure referred to atmosphere (1 bar absolute)							
Boiler operation		na	[hours/year]							
Kind of control		na	[CO/O ₂]							
Exhaust Gas Temper	rature	na	[°C] after eco	onomizers	economi	zer	yes no x			
O ₂ level in exhaust g	as in	na	[%]							
Rate of condensate	return	na	[%]	at [te	mperature of conde	ensate return]	na [°C]			
Rate of direct used s	steam	na	[%]	• • •	•					
Leakage detection st	team traps yes		no x			frequency	na [times/year]			
	<i>y</i> = 1	L	J <u>L</u>	I		. ,				

General										
information				Information Stear	n System					
				Installed						
Country	NL			Capacity		8,4 [MWth]				
Company number	11		System	Open	2% Closed 98%					
Sector	Paper processing									
Primary Bonch Mar	k Data (prioritized by S	toom Un no	rtporc)							
-		· · ·	1							
Efficiency of steam b			[%]							
Steam production e	•	0,79	[GJ/GJ]							
- Alternativ when ab					ture of feed in water]	12 [°C]				
- Alternativ when ab	ove not available		[m ³ gas/kg fresh wa	-						
	. .		[kg steam/ per proc	luct (piece, kg,						
Overall steam use ef	ficiency	NA	m2)]							
- Alternativ when ab	ove not available	NA	NA [m ³ gas for steam boiler / per product(piece, kg, m ²)]							
	ark Data (collect when	available)	1							
Kind of fuel		gas	[gas, oil, biomass]							
Nominal steam capa	city	NA	[tons/hour]							
Size of boiler		8,4	[MWth]							
Boiler Pressure										
level		11								
Boiler operation		NA	[hours/year]							
Kind of control			[CO/O ₂]							
Exhaust Gas Temper	Exhaust Gas Temperature NA		[°C] after economiz	ers ec	conomizer	yes no x				
O ₂ level in exhaust g	as in		[%]							
Rate of condensate	Rate of condensate return		[%]	at [temperature o	f condensate return]	[°C]				
Rate of direct used steam		98 2	[%]		· · · · · · · · · · · · · · · · · · ·	,				
Leakage detection st			no x	7	frequency	[times/year]				
	, yes	<u> </u>			nequency					

General										
information				Infor	mation Steam System					
				Instal						
Country	NL			Сара	•	1	11,6 [MWth]			
Company number	12			Syste	m	Open	Closed 100%			
Sector	Fruit processing (softdrink	s)								
Primary Bench Marl	Contract (prioritized by Steam	Up partne	rs)							
Efficiency of steam boiler			[%]							
Steam production ef	ficiency		[GJ/GJ]							
- Alternativ when ab	ove not available	197	[m³ gas/m	n3 feed in water]	at [temperature of feed	d in water]	NA [°C]			
- Alternativ when ab	ove not available									
			[kg steam/ per product (piece, kg,							
Overall steam use ef	ficiency	m2)]								
- Alternativ when ab	ove not available	12,62 m3 gas/ ton production								
	ark Data (collect when avai									
Kind of fuel		Gas	[gas, oil, b	-						
Nominal steam capa	city	2x 8,5	[tons/hour]							
Size of boiler		2x 5,82	[MWth]							
Boiler Pressure			<i>.</i>	6 1.						
level			[barg] (pressure referred to atmosphere (1 bar absolute)							
Boiler operation		6000	[hours/year]							
Kind of control			[CO/O ₂]							
Exhaust Gas Temper		130	[°C] after	economizers	economizer		yes x no			
O ₂ level in exhaust g	as in		[%]							
Rate of condensate return		100	[%]	at [te	mperature of condensa	te return]	80 [°C]			
Rate of direct used steam			[%]							
Leakage detection st	eam traps yes		no	x	frequ	uency	[times/year]			

General										
information				-	Information Stea	m System		_		
					Installed					
Country	Denmark				Capacity			[MWth]		
Company number	1			-	System	Open		Closed		
Sector	Pharmacuetical]						
-	Contraction (prioritized by Stea	· ·	1							
Efficiency of steam b		> 90	[%]							
Steam production ef	ficiency	1)	[GJ/GJ]						7	
- Alternativ when ab	ove not available	2)	[m³ gas/n	n3 feed in water	at [temperature	of feed in water]			[°C]	
- Alternativ when ab	ove not available		[m ³ gas/kg fresh water for steam]							
Overall steam use ef	ficiency	NA	[kg steam/ per product (piece, kg, m2)]							
- Alternativ when ab	ove not available		[m ³ gas for steam boiler / per product(piece, kg, m ²)]							
Additional Bench M	ark Data (collect when av	ailable)								
Kind of fuel		Nat. gas	[gas, oil, b	oiomass]						
Nominal steam capa	city		[tons/hour] (2*12.5) +							
		48	10 + 13 (gasturbine)							
Size of boiler			[MWth]							
Boiler Pressure										
level		8	[barg] (pressure referred to atmosphere (1 bar absolute)							
Boiler operation		5-6000	[hours/year]							
Kind of control		O ₂	[CO/O ₂]							
Exhaust Gas Temper	ature	90-105	[°C] after	economizers	e	economizer	yes	s x	no	
O ₂ level in exhaust g	as in		[%]							
Rate of condensate	Rate of condensate return 60		[%]		at [temperature of	of condensate retu	rn]		[°C]	
Rate of direct used s	team	40	[%]		-					
Leakage detection st	eam traps	ves x	no			frequency		12	[times/year]
						+ 2 ann.	overhaul			

1) Online measurement of steam production, 2) Gas meter and feed water temperature available.

General										
information				Information Stea	m System					
				Installed						
Country	Denmark			Capacity		[MWth]				
Company number	2		System	Open	Closed					
Sector	Laundry									
Drimery Bonch Mor	k Data (prioritized by St		rtnors)							
-	k Data (prioritized by Si									
Efficiency of steam b		89	[%]							
Steam production ef	•	90	[%]							
- Alternativ when ab	ove not available	100	[m ³ gas/m3 feed in v	vater] at [tempera	ture of feed in water] <u>130</u> [°C]				
- Alternativ when ab	ove not available	14,5	[kg steam/m ³ gas]							
			[kg steam/ per product (piece, kg,							
Overall steam use ef	fficiency		m2)]							
- Alternativ when ab	ove not available	[m ³ gas for steam boiler / per product(piece, kg, m ²)]								
Additional Bench M	ark Data (collect when	available)								
Kind of fuel		biomass	[gas, oil, biomass]	(8600 Kcal/kg)						
Nominal steam capa	icity	4	[tons/hour] ¹							
Size of boiler		2.736	[kWh]							
Boiler Pressure										
level		11-12	[barg] (pressure referred to atmosphere (1 bar absolute)							
Boiler operation		8760	[hours/year]							
Kind of control			$[CO/O_2]$							
Exhaust Gas Temper	rature	72,8	[°C] after economize	ers e	conomizer	yes x no				
O₂ level in exhaust g		4,2	[%]	-		,,				
Rate of condensate		4,2 80	[%]	at [temperature c	of condensate return]	95 [°C]				
Rate of direct used s		00	[%]		n condensate return]					
Leakage detection st		~		1	fragueses					
LEARAGE UELECLIUITS	team traps yes	X	no	J	frequency	2 [times/year]				

¹ LP: 8+15 ton/hour, HP: 11=10 tons/hour (11 comes from CHP)

General									
information			Information Steam System						
			Installed						
Country	Denmark		Capacity [MWth]						
Company number	4		System Open Closed						
	Laundry								
Sector									
-	k Data (prioritized by Steam								
Efficiency of steam	boiler	NA	[%]						
Steam production e	fficiency	2,5	[GJ/ton]						
- Alternativ when at	oove not available		[m ³ gas/m3 feed in water] at [temperature of feed in water] [°C]						
- Alternativ when at	oove not available		[kg steam/m ³ gas]						
			[kg steam/ per product (piece, kg,						
Overall steam use e	fficiency		m2)]						
- Alternativ when at	oove not available	93	[m ³ gas for steam boiler / per tons of paper)]						
			-						
Additional Bench N	lark Data (collect when avai	lable)							
Kind of fuel		nat. gas	[gas, oil, biomass] (8600 Kcal/kg)						
Nominal steam capa	acity	16 + 18	[tons/hour]						
Size of boiler			[kWh]						
Boiler Pressure									
level		15+12	[barg] (pressure referred to atmosphere (1 bar absolute)						
Boiler operation		8300	[hours/year]						
Kind of control			[CO/O ₂]						
Exhaust Gas Temperature 4		48	[°C] after economizers economizer yes x no						
O_2 level in exhaust g	gas in	3	[%]						
Rate of condensate	return	90-95	[%] at [temperature of condensate return] [°C]						
Rate of direct used steam [%]			[%]						
Leakage detection s	team traps yes		no frequency [times/year]						

General										
information			Information Steam System							
			Installed							
Country	Denmark		Capacity 1,04 [MWth]							
Company number	7		System Open Closed							
	Foods									
Sector										
Duine and David Mari	L Data (anianitia al bactera									
-	k Data (prioritized by Steam									
Efficiency of steam		NA								
Steam production e	•		[GJ/ton]							
- Alternativ when at	oove not available	15	[m ³ gas/m3 feed in water] at [temperature of feed in water] [°C]							
- Alternativ when at	oove not available		[kg steam/m ³ gas]							
			[kg steam/ per product (piece, kg,							
Overall steam use e	fficiency		m2)]							
- Alternativ when at	oove not available		[m ³ gas for steam boiler / per tons of paper)]							
Additional Bench N	lark Data (collect when avai	lable)								
Kind of fuel		nat. gas	[gas, oil, biomass] (8600 Kcal/kg)							
Nominal steam capa	acity	1,6	[tons/hour]							
Size of boiler			[kWh]							
Boiler Pressure										
level		7	[barg] (pressure referred to atmosphere (1 bar absolute)							
Boiler operation		8760	[hours/year]							
Kind of control	Kind of control		[CO/O ₂]							
Exhaust Gas Temperature		124	[°C] after economizers economizer yes no x							
O_2 level in exhaust g	gas in	4,1	[%]							
Rate of condensate	return	40	[%] at [temperature of condensate return] 90 [°C]							
Rate of direct used	steam		[%]							
Leakage detection s	team traps yes	x	no frequency 2 [times/year]							
		L								