

ELECTRIC INDUCTRIAL DOLL												
ELECTRIC INDUSTRIAL BOILI												
Date of factsheet	21-12-2018											
Author	Marc Marsidi											
Sector	Industry: Generic											
ETC / No. a ETC	ETC											
ETS / Non-ETS	ETS Et a 15 a 15											
Type of Technology	Electrification There are several types of sem	morcially available	industrial alastr	cic bailar systar	ns. The most se	mmon ara:						
Description	 There are several types of commercially available industrial electric boiler systems. The most common are: Using an electric heating element that acts as a resistance (electric boiler) Using the conductive and resistive properties of the water itself to carry electric current (electrode boiler) There are also infrared- and induction boilers available, but they are small-scale and not commonly available. 											
	Electric boilers and electrode boilers mainly apply to utility-related processes (hot water and steam production). The implementation threshold is perceived as relatively low, as it does not require a complete redesign of primary processes (Berenschot, Matters, Delft, & Matters, 2017). Because of the working principle, electric boilers have lower thermal											
	capacities than electrode boilers. Typical capacities of electric boilers are up to 5 MWe, whereas electrode boilers have capacities from 3 MWe up to 70 MWe. Superheated steam with temperatures of up to 350°C and >70 bar can be produced with commercially available electric/electrode boilers (capacities of up to 70 MWe). Advantages this technology are the following (Berenschot, Matters, Delft, & Matters, 2017; Berenschot, Delft, & ISPT, Power to products, 2015): • An efficiency of up to 95-99.9% • Robust • Can be used as flexible capacity (at times of low electricity prices or as stand-by capacity for gas-fired boilers).											
	Industrial electric boilers are a drop-in solution for steam production. They are implemented on-site at industrial plants where they heat a fluid (typically water for steam production and require no primary process alterations (Berenschot, Matters, Delft, & Matters, 2017).											
	Examples of electrode boiler manufactures and suppliers are PARAT, Vapor Power, Vapec, Allmech, Zander & Ingestrom, BVA Electrokessel. Examples of electric element boiler manufacturers and suppliers are PARAT, Vapor Power, AB&Co, Danstoker (Thermax) ATTSU, Lattner.											
	TRL 9 Current TRL level is 9, establish	TRL 9 Current TRL level is 9, established technology (Berenschot, Matters, Delft, & Matters, 2017).										
TECHNICAL DIMENSIONS	Functional Ur	nit					/alue and Ra	nge				
Capacity	MWth						20					
• ,				15			-			70		
	MWth	NL	Current				2030			2050		
Potential					-			-			-	
			Min	-	Max	Min	-	Max	Min	-	Max	
Market share	%				-			-			-	
						Min		Max	Min	-	Max	
			-	-	-	IVIIII	-	IVIUX				
Capacity utlization factor			-	-	-	TVIIII			.00	l	•	
· · ·			-	-	-	IVIIII	-	1.	1	•		
Full-load running hours per year	PJ/year		-	-	-	Will	-	1.	.00		0.03	
Full-load running hours per year Jnit of Activity	PJ/year		-	-	-	771111	-	1. 8,7	.00		0.03	
Full-load running hours per year Unit of Activity Fechnical lifetime (years)	PJ/year		-	-	-	771111	-	1. 8,7	00 760		0.03	
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MATERIAL FLOWS (OPTIONAL)											
Material flows	Material	Unit	Current			2030			2050		
	Steam	ton	-1.00			-			-		
			-1.00	-	-1.00	Min	ı	Max	Min	-	Max
	Water	ton		1.00				-			
			1.00	-	1.00	Min	-	Max	Min	-	Max
Material flows explanation	Typically water is used to produce st	eam.									
MISSIONS (Non-fuel/energy-related e	missions or emissions reductions (e.g	g. CCS)									
	Substance	Unit	Current			2030			2050		
Emissions				T	-			-		<u>, </u>	-
			Min	-	Max	Min	-	Max	Min	-	Max
					-			-		<u> </u>	-
			Min	-	Max	Min	-	Max	Min	-	Max
				 	-			<u>-</u>		-	-
			Min	-	Max	Min	-	Max	Min	-	Max
				ı	-			-		T	-
			Min	-	Max	Min	-	Max	Min	-	Max
Emissions explanation											
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