

STEAM METHANE REFOR											
	RMING (SMR) FOR HY	DROGEN	PRODUCT	ION							
	29-7-2018										
Author	Jacob Janssen Hydrogen supply										
Sector	Hydrogen supply										
ETS / Non-ETS	ETS										
Type of Technology	Steam methane reforming (SMR)										
Description	Steam methane reforming (SMR) is a method that can be used for producing hydrogen from natural gas. This is achieved in a processing device called a reformer which									ormer which i	reacts steam a
	high temperature with the gas. SMR uses the following endothermic reaction:										
	CH4 + H2O ⇌ CO + 3H2.										
	The reaction is carried out at an activation energy of 206 kJ/mol and temperatures of 500-900 degrees Celsius [3]. In this SMR plant, a COGEN plant is running to export a relatively small fraction of the energy involved to the electricity grid.										
	TRL 9										
TRL level 2020	Mature technology. No more cost	develonments	are assumed								
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TECHNICAL DIMENSIONS											
Capacity	Functional Unit	Value and Range									
	MW						300				
				Min			-			Max	
Potential Market share	MW	NL				Unlimited					
			Min		-			Max			
	%								-		
			Min				-		Мах		
Capacity utlization factor									1.00		
Unit of Activity	PJ/year										
Technical lifetime (years)									25		
Full-load running hours per year									8,322		
Progress ratio									0.95		
Hourly profile	No										
Explanation	IEA (2017) reports 100,000 Nm3/h	at 10.8 MJ/Nm3	3, this translates	into a capacit	y of precisely 30	00 MW hydroge	n energy outp	out. The progres	ss ratio can be f	ound in Thon	nas (2009).
COSTS											
Year of Euro	2015										
Investment costs per year Other costs per year Fixed operational costs per year (excl. fuel costs)	Euro per Functional Unit			Current			2030		2050		
	mln. € / MW				0.74			0.74			0.7
			0.74	-	0.74	0.74	-	0.74	0.74	-	0.74
	mln. € / MW				-			-			-
			Min	-	Max	Min	-	Max	Min	-	Max
	mln. € / MW		,		0.03	<u> </u>		0.03	<u>l</u>		0.03
			0.03	-	0.03	0.03	-	0.03	0.03	-	1
	mln. € / MW		0.03	-	0.03	0.03	-	0.03	0.03	-	0.03
Variable costs per year	mln. € / MW		0.03	-	T T	0.03	-		0.03	-	0.03
	The data from NTNU (2016) is base		0.24 size plant, and t		0.03 0.24 0.24 n this factsheet	0.24 are scaled to re		0.03 0.24 0.24 ame size plant a	0.24 as in IEA (2017).		0.03 0.24 0.24 lude fuel costs
	The data from NTNU (2016) is base and values are based on low heating	ng value (LHV). S	0.24 size plant, and t Sinnot (2009) find	ds a higher (po	0.03 0.24 0.24 n this factsheet er kg of hydroge	0.24 are scaled to re en output) value	for investme	0.03 0.24 0.24 ame size plant ant costs, which	0.24 as in IEA (2017). can in part be e	xplained by t	0.0 0.2 0.2 lude fuel costs the use of data
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